

Digital
Human Machine Interface ———

Pro-face

LT Series User Manual

Digital
Digital Electronics Corporation

Preface

Thank you for purchasing the Pro-face Graphic Logic Controller LogiTouch (hereby referred to as “LT” or “LT unit”).

Please read this manual carefully; it explains, step by step, how to use the LT correctly and safely.

< Note >

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Essential Safety Precautions

This user manual contains a variety of safety markings for safe and correct operation of the LT unit. Please read this and any related manuals carefully to fully understand the correct and safe usage of the LT and its features.

■ Safety Symbols

Please pay attention to the following safety symbols and their meanings:



Indicates situations that will definitely result in severe bodily injury, death, or major machine damage if the instructions are not followed.



Indicates situations that may result in severe bodily injury, death, or major machine damage if the instructions are not followed.



Indicates situations that may result in minor bodily injury or damage to the machinery if the instructions are not followed.

DANGERS

When Designing your LT System:

- **Be sure to design your LT control system so that, in the event of a main power supply failure or an LT accident, the user system's overall safety integrity will be maintained. If this is not done, incorrect output signals or an LT malfunction may cause an accident.**
 - (1) **Interlock and other circuits designed to interrupt or oppose normal machine movement (such as Emergency Stop, General Protection, and forward and reverse rotation), as well as those designed to prevent machine damage (such as upper, lower, and traverse movement limit positioning) should all be designed to be located outside of the LT.**

 **DANGERS**

(2) When the LT generates a “Watchdog Timer Error,” LT operation will halt. Also, when Errors occur in Input/Output control areas that the LT cannot detect, unexpected movement may occur in those areas. Therefore, and to prevent unsafe machine movement, a “Failsafe Circuit” should be created which is completely external to the LT.

▼ **Reference** ▲ *Section 3.2.5 – “Installation Cautions”*

- (3) If a problem arises with an external unit’s relay or transistor that causes an output (coil) to remain either ON or OFF, a major accident can occur. To prevent this, be sure to set up external watchdog circuits that will monitor vital output signals.
- Design a circuit that will supply power to the LT unit’s I/O unit before starting up the LT. If the LT unit’s internal program enters RUN mode prior to the I/O unit’s load control power turning ON, an incorrect output (signal) or malfunction could cause an accident.
 - Design a user program that ensures the safety of the user’s system, in the event of an LT display or control error, or either a data transmission error or power failure between the LT and a connected unit. These types of problems can lead to an incorrect output (signal) or malfunction, resulting in an accident.
 - Do NOT use the LT as a warning device for critical alarms that can cause serious operator injury, machine damage, or production stoppage. Use stand-alone hardware and/or mechanical interlocks to design alarm indicators and their control/activator units.
 - Do NOT use LT touch panel switches to perform operator safety-related or important accident-prevention operations. These operations should be performed by separate hardware switches to prevent operator injury and machine damage.

DANGERS

- Design your system so that equipment will not malfunction due to a communication fault between the LT and its host controller. This is to prevent any possibility of bodily injury or material damage.
- The LT is not appropriate for use with aircraft control devices, medical life-support equipment, central trunk data transmission (communication) devices, or nuclear power control devices, due to their inherent requirements of extremely high levels of safety and reliability.
- When using the LT with transportation vehicles (trains, cars, and ships), disaster and crime prevention devices, various types of safety equipment, and medical devices that are not life-support related, use redundant and/or failsafe system designs to ensure the proper degree of reliability and safety.

WARNINGS

- Unlike the LT unit's "Standby Mode," after the LT unit's backlight burns out, the touch panel is still active. If the operator fails to notice that the backlight is burned out and touches the panel, a potentially dangerous machine operation error can occur. Your backlight is burned out if:
 - your LT is not set to "Standby Mode" and the screen has gone blank
 - your LT is set to "Standby Mode," but touching the screen does not cause the display to reappear

To prevent an accidental machine operation error, Pro-face recommends that you use the LT unit's "USE TOUCH PANEL AFTER BACKLIGHT BURNOUT" feature, to automatically detect a burnout and disable the touch screen.

 **Reference** *Section 6.4.3 – "Set Up Touch Panel"*



WARNINGS

Installation Warnings:

- **High voltage runs through the LT. To prevent an electrical shock, do NOT disassemble the LT for any reason other than to replace the backlight.**
- **Do NOT modify the LT unit. Doing so may cause a fire or an electrical shock.**
- **Do NOT use the LT in an environment where flammable gases are present. Doing so may cause an explosion.**

Wiring Warnings:

- **To prevent electrical shock or equipment damage, unplug the LT unit's power cord from the power supply prior to installing or wiring the LT.**
- **After completing any LT wiring work, be sure the terminal block's protective plastic cover is reattached. If this cover is not reattached, an electrical shock could easily occur.**
- **High voltage runs through the LT. Except for changing the backlight, do NOT attempt to open the LT, since there is a possibility of an electrical shock.**
- **Do NOT use power levels with the LT that are higher or lower than the LT unit's specified power range. Doing so may cause a fire, electrical shock, or LT damage.**
- **Do NOT operate or store the LT in areas where flammable gases are present and may cause an explosion.**

Operation and Maintenance Warnings:

- **NEVER touch a live power terminal. Doing so could cause an electrical shock or a machine malfunction.**
- **To prevent an electrical shock, unplug the LT unit's power cord before either cleaning the LT or attaching/detaching the power terminal attachment screws.**
- **When replacing the LT unit's backlight, be sure to unplug the unit's power cord to prevent an electrical shock, and wear safety gloves to prevent burns.**



WARNINGS

- The LT uses a lithium battery to back up its internal clock and to control memory data. If the battery is incorrectly replaced (reversed positive [+] and negative [-] ends), the battery may explode. Therefore, Pro-face recommends that you contact your local LT distributor for instructions before replacing or changing the battery.
- Do not attempt to modify the LT unit's internal parts or wiring in any way, since this may lead to either electrical shock or fire.



CAUTIONS

Wiring Layout Cautions:

- To prevent an LT unit malfunction due to excessive noise, isolate all LT input/output signal lines from all power wiring or power cables via a separate wiring duct.

Installation Cautions:

- To reduce the risk of incorrect input or output signals, be sure that any data cables attached to the LT unit's connector make full contact with the connector pins.

General Wiring Cautions

- To prevent electrical shocks or malfunctions, be sure the LT unit's FG (earth) wire is grounded as follows:
 - (1) maximum grounding resistance: 100 Ω
 - (2) minimum grounding wire diameter: 2mm²
- The LT unit's wiring should be checked to confirm that both the operating voltage and wiring terminal locations are correct. If either the voltage or the wiring terminal location is incorrect, it can cause a fire or accident.
- Be sure to secure all wiring terminal screws with the designated torque. Screws and terminals that become loose can cause a short circuit, fire, or accident.



CAUTIONS

- **Be sure that metal filings or wiring remnants do not fall inside the LT, since they can cause a fire, accident, or malfunction.**

LT Operation and Maintenance Cautions

- **Be sure to read the LT unit's manual and online help information carefully before performing program changes, entering forced output, or using the RUN, STOP, or PAUSE commands while the LT is in operation. Mistakes concerning the use of these items can cause a machine accident or damage.**
- **The liquid crystal panel contains a powerful irritant. If, for any reason, the panel is damaged and this liquid enters your eyes, flush your eyes for 15 minutes with running water and contact a physician immediately.**

LT Unit Disposal Cautions

- **The LT unit should be disposed of in a manner appropriate to, and in accordance with, the user country's industrial machinery disposal standards.**

General Safety Precautions

- Do NOT strike the touch panel with a hard or pointed object, or press on the touch panel with too much force, since it may damage the touch panel or the display.
- Do NOT install the LT where the ambient temperature can exceed the allowed range. Doing so may cause the LT to malfunction or shorten its operation life.
- Do NOT restrict or limit the LT unit's naturally-occurring, rear-face ventilation, and do NOT store or use the LT in overheated areas.
- Do NOT store or use the LT unit in areas where large, sudden temperature changes can occur. These changes can cause condensation to form inside the unit, which can cause possible unit malfunctions.
- Do NOT allow water, liquids, metals, or charged particles to enter inside the LT unit's outer casing, since they can cause either an LT malfunction or an electrical shock.
- Do NOT store or use the LT in direct sunlight, or in excessively dusty or dirty environments.
- Do NOT store or use the LT in an environment where shaking or excessive vibration can occur.
- Do NOT store or use the LT where chemicals (such as organic solvents and acids) can evaporate, or in environments where chemicals and acids are present in the air.
 - Corrosive chemicals: acids, alkalines, liquids containing salt
 - Flammable chemicals: organic solvents
- Do NOT use paint thinner or organic solvents to clean the LT.
- Do NOT store or operate the LCD display in areas that receive direct sunlight, since the sun's ultraviolet (UV) rays may cause the quality of the LCD to deteriorate.
- Storing this unit in areas at temperatures that are lower than is recommended in this manual's specifications may cause the LCD panel's liquid to congeal, which may damage the panel. Conversely, if the storage area's temperature becomes higher than the allowed level, the LCD panel's liquid will become isotropic, causing irreversible damage to the LCD. Therefore, be sure to store the panel only in areas where temperatures are within the ranges specified in this manual.
- Due to the possibility of unexpected accidents, be sure to back up the LT unit's screen data regularly.

■ About the LT Unit's Display Panel

- The data that is currently displayed on the LT unit's screen, the screen's brightness, and the LT unit's voltage¹ each affect the screen's intensity of *Contouring* — a wavelike pattern that is created when some parts of the screen are brighter than others.
- The minute, dark and light grid-points on the display panel's surface is part of the LT unit's design and are not defects.
- Extended shadows, or “Crosstalk”, may appear on the sides of screen images. This is normal for an LCD panel.
- Sometimes the display area may look as if the display colors have changed. This is a common attribute of LCDs and is not a defect.
- Displaying a single image for long periods of time can cause an afterimage to remain when the screen display is changed.

To prevent this effect:

- Use the LT unit's “Standby Mode,” which automatically turns the screen OFF when no input is entered within a specified period of time.

▼ **Reference** ▲ *Section 6.3.1 – “System Setup”*

- Write “FFFFh” to the System Data Area's “Screen Display Off” address² to turn the screen display OFF when the following actions are not performed within the user-specified period of time.
 - Change Screen
 - Touch Screen
 - Alarm Display
- Do NOT display any single screen for a long period of time. Try to change the screen display periodically.

1 Operating the LT unit in the lower range of its allowable operating voltage may affect the intensity of contouring.

2 The following addresses assume all System Data Area settings are entered. If they are not all entered, the correct word address may be different, since the following addresses are relative, not fixed, addresses.

- *With the Direct Access Method — use System Data Area word address +9*
- *With the Memory Link Method — use System Data Area word address +12*

▼ **Reference** ▲ *LT Editor Device Connection Manual (included with the LT Editor software)/GP-PRO/PBIII Device/PLC Connection Manual (included with the C-Package software)*

About LT Series Models

The LT Series refers to the following LT model numbers:

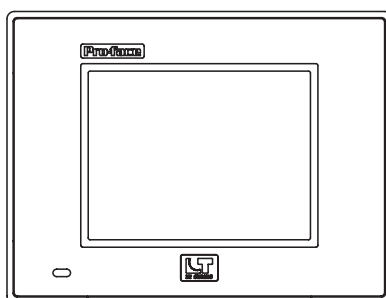
LT Series

Name	Model	Description
LT Type A1	GLC150-BG41-XY32SK-24V	16-point Input Sink/Source and 16-point transistor Output Sink type
LTC Type A1	GLC150-SC41-XY32SK-24V	
LT Type A2	GLC150-BG41-XY32SC-24V	16-point Input Sink/Source and 16-point transistor Output Source type
LT Type B	GLC150-BG41-FLEX-24V	Flex Network I/F
LT Type B+	GLC150-BG41-XY32KF-24V	16-point Input Sink/Source and 16-point transistor Output Sink, and Flex Network I/F type
LTC Type B+	GLC150-SC41-XY32KF-24V	
LT Type C	GLC150-BG41-RSFL-24V	Flex Network I/F and SIO I/F

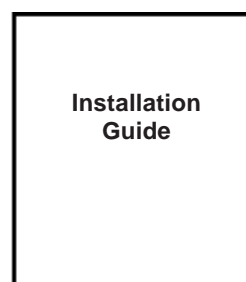
Package Contents

Please verify that the LT unit's packing box contains all the items listed below.

■ LT Unit (1)



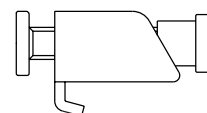
■ Installation Guide (1)*¹



■ Installation Gasket (1)

■ Flex Network I/F Connector (1) (Included with LT Type B/B+/C/LTC Type B+ units only)

■ Installation Fasteners (4/set)



Special care and attention have been given to the packaging of this LT unit. However, if any of the items are damaged or missing, please contact your local LT distributor immediately for prompt service.

¹ The LT Series User Manual (this manual) is sold separately.

UL/c-UL Application Notes

UL1604 for UL hazardous locations ends on July 31, 2012.

As a result, for models produced from August 1, 2012 onward, UL1604 will not apply. Additionally, those models will have UL508 certification revoked as they achieved the standard dependent on getting UL1604 certification.

Please refer to the Pro-face home page for more details.

URL

<http://www.pro-face.com/worldwide/safety/ul.html>

CE Marking Notes

The GLC150-**41-****-24V units are CE marked products that conform to EMC directives EN55011 class A and EN61000-6-2.

Conformance Standards to EMC Directives

The EN61000-6-2 standard requires that products connected to an unprotected DC line have 500V resistance (normal mode/common mode) in accordance with the 61000-4-5 surge test.

However, note that the power supply for the DIO of the LT unit is designed on the assumption that it is connected to a protected DC power-supply line. Therefore, the surge test included in this specification is inapplicable.

This LT unit's 24V Power Input for DIO is not equipped with protection against lightning surges. Therefore, it is not lightning surge resistant. To make your LT unit or system compliant with EMC directives, connect the LT unit to surge protected power, and set up surge resistance for your LT unit or overall system. For example, when an LT unit mounted to a control panel is supplied DC24V power in accordance with the EMC directive, this LT unit's input side is protected from power surges.

CNS Notes

The GLC150-BG41-****-24V units comply with the following CNS standards:

- CNS 13438 (Class A)

<Caution>




The LT is an Industrial Device (Class A Device). Home use of this device may cause radio wave interference with nearby devices. If interference does occur, please try a variety of countermeasures to solve the problem.

<警告使用者>

這是甲類的資訊產品、在居住的環境中使用時、可能會造成射頻干擾、在這種情況下、使用者會被要求採取某些適當的對策。

Documentation Conventions

The list below describes the documentation conventions used in this manual.

Symbol	Meaning
	Indicates important information or procedures that must be followed for correct and risk-free software/device operation.
LT or LT unit	LT Type A1/Type A2/Type B/Type B+/Type C, LTC Type A1/Type B+
LT Editor	Indicates the LT Editor software.
C-Package	Indicates Screen Creation software GP-PRO/PBIII and Logic Program Development software Pro-Control Editor.
External Device	Indicates peripheral devices (such as Temperature Controllers, Inverters, etc.), but does not include Flex Network and DIO units.
*1	Provides useful or important supplemental information.
	Provides useful or important supplemental information.
	Cross-references to useful or important supplemental information.

Software Compatibility List

The LT Series of operator interfaces can use either of the following software packages to create both screens and logic programs.

- GP-PRO/PBIII C-Package03 or later
- LT Editor

However, the LT color-type operator interfaces must use the GP-PRO/PBIII C-Package03 or later software. LT Editor software cannot be used.

Also, for LT Type B+ Series units, the LT Editor version must be 1.04 or higher.

Please be sure to read the following table prior to creating your screens and logic programs, as the software that can be used will vary depending on the type of unit.

Model Number	LT Editor	C-Package03 or later
GLC150-BG41-XY32SK-24V	○	○
GLC150-SC41-XY32SK-24V	X	○
GLC150-BG41-XY32SC-24V	○	○
GLC150-BG41-FLEX-24V	○	○
GLC150-BG41-XY32KF-24V	○ (Version 1.04 or later)	○
GLC150-SC41-XY32KF-24V	X	○
GLC150-BG41-RSFL-24V	○	○

Memo

Chapter

1 Introduction

1. Prior to Operating the LT
2. System Design
3. Accessories

1.1 Prior to Operating the LT

Use the following steps when creating projects for the LT unit.

1. **Preparation** – Before using the LT, be sure that you have all required hardware, and have read all specification, wiring, and installation information.

Reference *Chapter 2 – “Specifications” and Chapter 3 – “Installation and Wiring”*

2. **Design** – Design your LT screens and create a logic program.

3. **Install the LT Editor/C-Package** – Install the LT Editor/C-Package software in your PC.

Reference *LT Editor CD Jacket, C-Package CD Jacket*

4. **Develop Logic Program** – Use the LT Editor/C-Package software to develop a logic program and set the operation mode.

Reference *LT Editor Operation Manual – Logic Programming Guide, Pro-Control Editor Operation Manual/User Manual (included with the C-Package software)*

5. **Create Screen / Run Screen Setup** – Use the LT Editor software to set up the screen and parts according to your screen design.

Reference *LT Editor Operation Manual – Screen Creation Guide, GP-PRO/PBIII Operation Manual (included with the C-Package software)*

6. **Transfer Screen Data and Logic Program** – Use the LT Editor/C-Package software to transfer your screen data and logic program to the LT unit.

Reference *LT Editor Operation Manual – Screen Creation Guide, GP-PRO/PBIII Operation Manual (included with the C-Package software)*

7. **Monitor Logic Program** – Use the LT Editor/C-Package software's monitor feature to check that your logic program operates correctly.

Reference *LT Editor Operation Manual – Logic Programming Guide, Pro-Control Editor Operation Manual (included with the C-Package software)*

8. **Initialize** – Set up the LT unit's Initial Settings according to your operation needs.

Reference *Chapter 5 – “Initializing the LT”, LT Editor Device Connection Manual and GP-PRO/PBIII Device/PLC Connection Manual (included with the C-Package software)*

9. **Operation** – Connect the LT to an external device and begin operation.

Reference *LT Editor Device Connection Manual, GP-PRO/PBIII Device/PLC Connection Manual (included with the C-Package software)*



Note:

Each LT Editor/C-Package manual referenced above is included with the LT Editor software, and is also available as a PDF file on the CD-ROM.

1.2 System Design

1.2.1 System Design

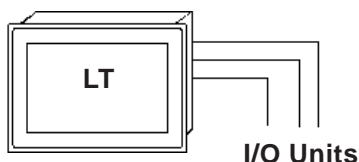
There are five (5) LT series unit types: Type A1, Type A2, Type B, Type B+ and Type C.

LT Series

Name	Model	Description
LT Type A1	GLC150-BG41-XY32SK-24V	16-point Input Sink/Source and 16-point transistor Output Sink type
LTC Type A1	GLC150-SC41-XY32SK-24V	
LT Type A2	GLC150-BG41-XY32SC-24V	16-point Input Sink/Source and 16-point transistor Output Source type
LT Type B	GLC150-BG41-FLEX-24V	Flex Network I/F
LT Type B+	GLC150-BG41-XY32KF-24V	16-point Input Sink/Source and 16-point transistor Output Sink, and Flex Network I/F type
LTC Type B+	GLC150-SC41-XY32KF-24V	
LT Type C	GLC150-BG41-RSFL-24V	Flex Network I/F and SIO I/F

■ Stand-alone 32 point I/O System (Type A1/Type A2)

The LT can independently control up to 32 external I/O units (DC 24V 16-point Input/16-point Output).

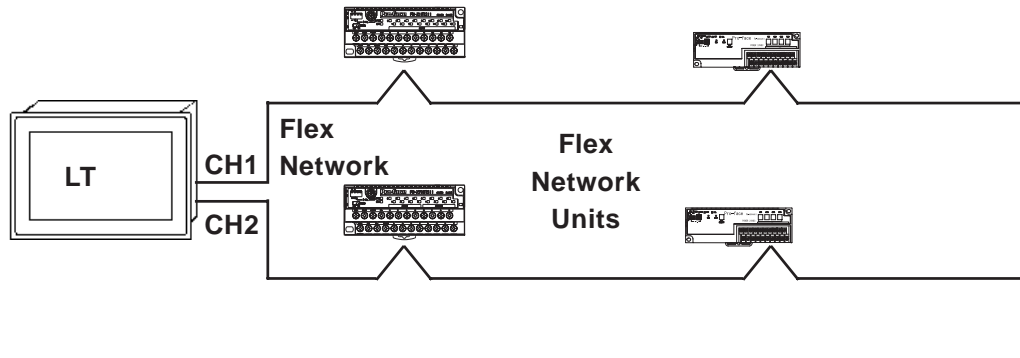


■ Flex Network System (Type B)

Connecting Flex Network units to the LT unit allows you to use the LT to control remote I/O.

Flex Network I/O units are connected to the LT via the Flex Network I/F unit, which is equipped with 2 channels — CH1 and CH2. Through these channels, the LT can send identical communication data. You can select either one of these channels, or both, when sending communication data to the external I/O units.

Using a single channel enables you to send communication data to 31 I/O units via one channel, and to 32 I/O units via the other channel. Therefore, using both channels, the LT can communicate with a total of 63 Flex Network I/O units.



Reference For detailed information about the Flex Network, refer to the *Flex Network User Manual*.

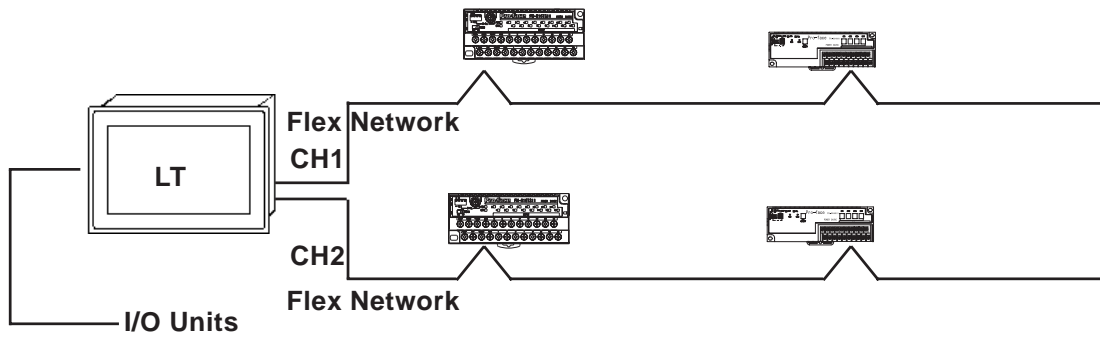
■ 32 Point I/O + Flex Network System Design (Type B+)

The LT unit can independently control up to 32 I/O units. (DC24V Input 16 points/ Output 16 points Sink)

Connecting Flex Network I/O units to the LT allows the LT to control any remote I/O unit. When connecting the I/O unit, two channels are available — CH1 and CH2. Each channel outputs the same data and can be used for data communication.

When using a single channel, the maximum number of I/O units that can be connected is 30, and when using a second channel, the number increases by 32, for a total of 62 I/O units.

Since this unit's 32 point I/O occupies one of the units in the Flex Network system, the total number of units available on Channel 1 is 31, and on Channel 2 is 32, for a total of 63 units.



Reference For detailed information about the Flex Network, refer to the *Flex Network User Manual*.

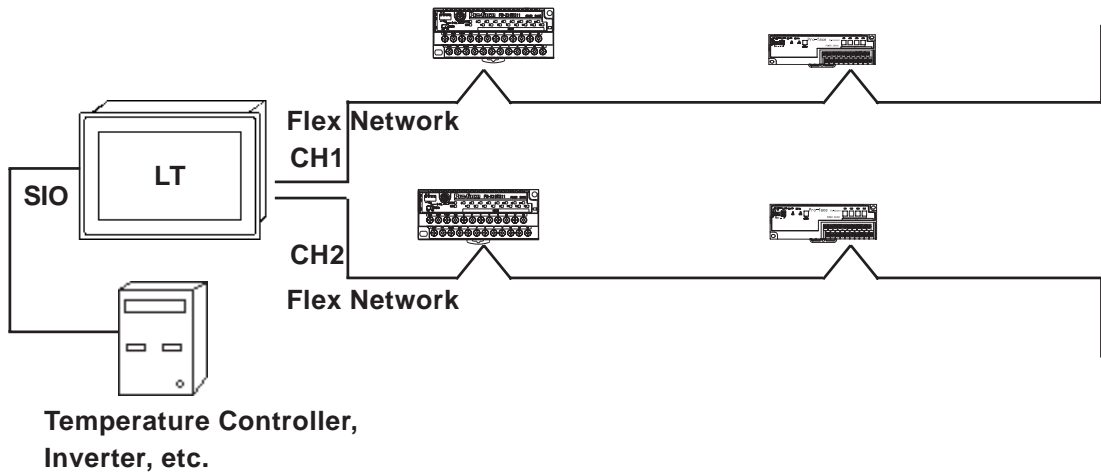
Chapter 1 – Introduction

■ Flex Network / SIO System Design (Type C)

Connecting Flex Network I/O units to the LT allows the LT to control any remote I/O unit. When connecting the I/O unit, two channels are available — CH1 and CH2. Each channel outputs the same data and can be used for data communication.

When using a single channel, the maximum number of I/O units that can be connected is 31, and when using a second channel, the number increases by 32, for a total of 63 I/O units.

The LT unit's serial interface allows you to connect to external devices such as temperature controllers or inverters.

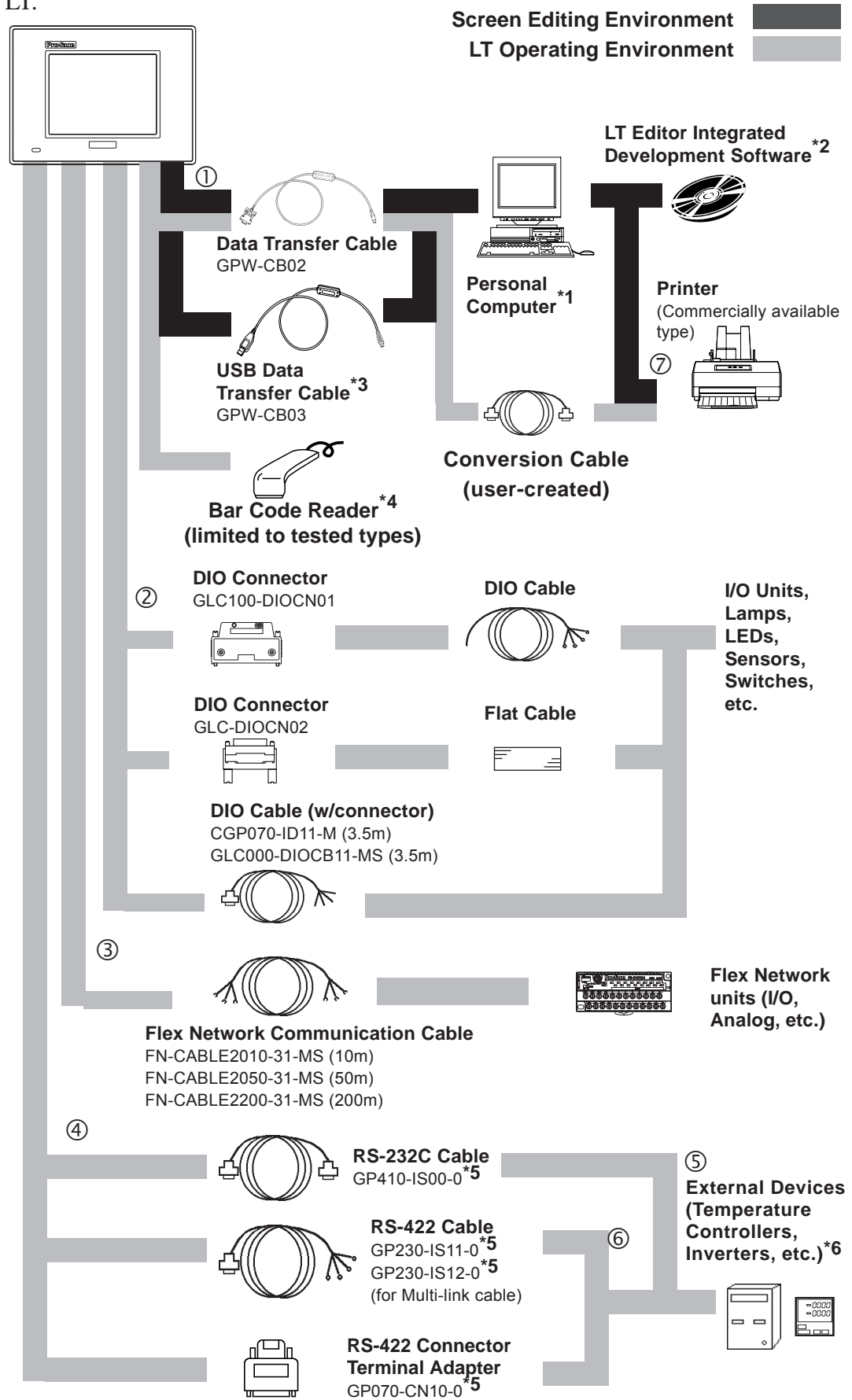


▼ **Reference** ▲ For detailed information about the Flex Network, refer to the *Flex Network User Manual*.

For information about external devices, refer to the *LT Editor Device Connection Manual* (included with the LT Editor software), *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software).

1.2.2 Product Lineup

The following diagram represents the main selection of devices connectable to the LT.



Chapter 1 – Introduction

- 1 For the range of compatible PCs, refer to the
▼Reference▲ *LT Editor CD Jacket* (included with the LT Editor software),
C-Package CD Jacket
- 2 The software that can be used will vary depending on the type of unit.
▼Reference▲ *Software Compatibility List*
- 3 Software version limitations apply.
▼Reference▲ For details, *USB Data Transfer Cable Installation Guide*.
- 4 See Page 1-7 for recommended units.
- 5 Certain types and models of external devices cannot be connected.
▼Reference▲ *LT Editor Device Connection Manual* (included with the LT Editor software), *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software)
- 6 For information about compatible external device types, refer to the
▼Reference▲ *LT Editor Device Connection Manual* (included with the LT Editor software), *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software)

LT Interfaces

- ① Tool Connector
- ② I/O Connector (Type A1/Type A2/Type B+)
- ③ Flex Network Interface (Type B/Type B+/Type C)
- ④ Serial Interface (Type C)

External Device Interface (for Temperature Controllers, Inverters, etc.)

- ⑤ RS-232C Port
- ⑥ RS-422 Port

Personal Computer Interfaces

- ⑦ Printer Interface

■ Recommended Units

The following tables list I/O devices that have been confirmed to be compatible with the LT. If you connect a device other than those listed below, be sure to confirm that the connection functions correctly using an actual unit.



Recommended units are subject to change without notice.

Bar code readers (Connected to Tool Connector)

NEC Infrontia	BCK5435-STA	Touch Scanner (Read Width: 56mm) ^{*1*2}
	BCK5535-STA	Touch Scanner (Read Width: 85mm) ^{*1*2}

**1 Be sure to use the Y cable included with the unit and connect it between the LT unit and a bar code reader. Data cannot be read correctly, if a non-"Y" cable is used, or if the bar code reader is connected directly to the LT unit.*

**2 The following settings must be entered prior to using the bar code reader with a LT unit.*

1) Set the CAPS.

2) Add the Carriage Return (CR) in the Postamble's settings.

For the details about these settings, please refer to the Installation Guide included with the bar code reader unit.

1.3 Accessories

The following items are optional LT products (sold separately).

■ Available Software*1

Product Name	Model No.	Description
LT Editor	GLCLT-ED01W-V**	Software used to create the LT unit's screen data and to develop a logic program.
C-Package 03 or later	GPPRO-CNT03W-P03	

1 The software that can be used will vary depending on the type of unit.

▼Reference▲ Software Compatibility List

■ Tool Connector

Product Name	Model No.	Description
Data Transfer Cable	GPW-CB02	Connects the LT to a PC; transfers screen data and user program(s).
USB Data Transfer Cable*1	GPW-CB03	

1 Software version limitations apply.

▼Reference▲ For details, USB Data Transfer Cable Installation Guide.

■ I/O Interfaces (Type A1/Type A2/Type B+)

Product Name	Model No.	Description
DIO Connector	GLC100-DIOCN01	Connector (must be soldered) and connector cover, including five pieces of FCN-361J040-AU (connector) and FCN-360C040-B (connector cover). Manufactured by Fujitsu Component Corp.
	GLC-DIOCN02	Crimp connector for ribbon cable. (5/set) Fujitsu Component Ltd. FCN-367J040-AU/F
DIO Cable	CGP070-ID11-M	3.5m cable that includes Fujitsu Component Ltd.'s pre-attached connector (FCN-361J040-AU) and connector cover FCN-360C040-B. Power/Common: AWG#22/Approved for 7A current (red/black) I/O Signal: AWG#24/Approved for 5A current (yellow/green) Includes wire marking cover (not terminated)
	GLC000-DIOCB11-MS	3.5m cable that includes Fujitsu Component Ltd.'s pre-attached connector (FCN-361J040-AU) and connector cover FCN-360C040-B. Power/Common: AWG#22/Approved for 7A current (green) I/O Signal: AWG#24/Approved for 5A current (green) Includes wire marking cover (not terminated) The same reference number as the connector No. is used for the wire marking cover in the description.

■ Flex Network Interface (Type B/Type B+/Type C)

Product Name	Model No.	Description
Flex Network Communication Cable	FA-CABLE2010-31-MS (10m)	Connect GLC/LT units with Flex Network units.
	FN-CABLE2050-31-MS (50m)	
	FN-CABLE2200-31-MS (200m)	

■ Serial Interfaces (Type C)

Product Name	Model No.	Description
RS-232C cable**1	GP410-IS00-0	Interface cable between the external device and the LT.
RS-422 cable**1	GP230-IS11-0	
	GP230-IS12-0 (for Multi-link)	
RS-422 cable Connector Terminal Block Conversion Adapter**1	GP070-CN10-0	Conversion adapter converts serial data to the RS-422 format.

1 **Reference** For detailed information about the range of connectable external devices, refer to the *LT Editor Device Connection Manual* (included with the LT Editor software) and the *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software).

■ Flex Network I/O Units (Type B/Type B+/Type C)

Product Name	Model No.	Description
Flex Network 16-Point Input Sink Source Type I/O Unit	FN-X16TS41	16-point sink/source shared I/O Unit. DC24V input signal can be connected.
Flex Network 32-Point Input Sink Source Type I/O Unit	FN-X32TS41	32-point sink-source shared I/O Unit. DC24V input signal can be connected.
Flex Network 16-Point Output Sink Type I/O Unit	FN-Y16SK41	16-point output sink I/O Unit.
Flex Network 16-Point Output Source Type I/O Unit	FN-Y16SC41	16-point output source I/O Unit.
Flex Network 8-Point Input Sink Source / 8-Point Transistor Output Sink Type I/O Unit	FN-XY08TS41	8-point input sink-source and 8-point transistor output sink mixed I/O unit. Both DC24V input signals and DC24V output (load current: 200mA max.) devices can be connected.
Flex Network 16-Point Input Sink Source / 16-Point Transistor Output Sink Type I/O Unit	FN-XY16SK41	16-point input sink-source and 16-point transistor output sink mixed I/O unit. Both DC24V input signals and DC24V output (load current: 200mA max./1.6A/common) devices can be connected.
Flex Network 16-Point Input Sink Source/16-Point Transistor Output Sink Type I/O Unit	FN-XY16SC41	16-point input sink-source and 16-point transistor output source mixed I/O unit. Both DC24V input signals and DC24V output (load current: 200mA max./1.6A/common) devices can be connected.
Flex Network 32-Point Input Sink Source / 32-Point Transistor Output Sink Type I/O Unit	FN-XY32SKS41	32-point input sink-source and 32-point transistor output sink mixed I/O unit. Both DC24V input signals and DC24V output (load current: 200mA max./1.6A/common) devices can be connected.
Flex Network 8-Point Relay Output / 1 Common Type I/O Unit	FN-Y08RL41	8-point relay output(1 common)I/O Unit. Up to AC240V (1A) load current can be connected.

Chapter 1 – Introduction

■ Analog Units

Product Name	Model No.	Description
Flex Network 2-Channel Analog/Digital Conversion	FN-AD02AH41	Converts 2-channel analog signals to digital signals at 12-bit resolution.
Flex Network 2-Channel Digital/Analog Conversion	FN-DA02AH41	Converts 2-channel 12-bit digital signal to analog signal and sends output.
Flex Network 4-Channel Analog/Digital Conversion	FN-AD04AH11	Converts 4-channel analog signals to digital signals at 12-bit resolution.
Flex Network 4-Channel Digital/Analog Conversion	FN-DA04AH11	Converts 4-channel 12-bit digital signal to analog signal and sends output.

■ Positioning Units

Product Name	Model No.	Description
Flex Network Single-Axis Positioning Unit	FN-PC10SK41	Both of this unit and GLC/LT can store positioning data. Motor driver connection cable(FN-PC10CB01) is required.
Flex Network Teaching Loader for Single-Axis Positioning Unit	FN-PC10LD41	Programmer for Single-Axis Positioning Unit. Allows entry, editing and operation checking of high-precision positioning data (5m cable included)

■ High-Speed Counter Unit

Product Name	Model No.	Description
Flex Network High Speed Counter Unit	FN-HC10SK41	High performance High-Speed counter that can easily change counter input types. Can create both a wide range of data and cam output.

■ Optional Items

Item	Model No.	Description
Screen Protection Sheet (5 sheets/set)	GP37W2-DF00	Disposable protective and dirt-resistant sheet for the LT unit's screen. The LT unit's touch panel can be used with this cover sheet attached.
Single-Axis Motor Driver Connection Cable	FN-PC10CB01 (1m)	Connects the Flex Network single-axis positioning unit and the servo and stepping drivers.

■ Optional Maintenance Items

The following items are included in the LT unit's packing box, and are also sold separately.

Product Name	Model No.	Description
Installation Fastener (4 fasteners/set)	GP070-AT01	Fasteners to attach the LT to a panel.
Installation Gasket	GP37W2-WP00-MS	Provides a moisture-resistant seal when installing the LT. Same as the seal included in the LT unit's original equipment package.
Flex Network Communication Cable Connector	FN-IFCN01	Connector is attached to the Flex Network I/F unit. Enables the connection of the Flex Network Communication Cable.
Single Axis Teaching Loader Cable	FN-LD10CBL (5m)	Connects the Single-Axis Positioning unit to the Single-Axis Teaching Loader.
DIO Connector (Spring Type)	GLC-DIOCN03	Connectors (terminal screws) for "FN-XY32SKS41", "FN-XY32SCS41" units. Easy-to-use spring-clamp type.

Chapter

2 Specifications

1. General Specifications
2. Functional Specifications
3. Interface Specifications
4. Part Names and Functions
5. Dimensions

2.1 General Specifications

2.1.1 Electrical

Rated Voltage	DC 24V
Voltage Supply Range	DC 20.4V to DC 28.8V
Allowable Voltage Drop	10 ms or less
Power Consumption	20 W or less
In-Rush Current	30 A or less
Voltage Endurance	AC 1000V at 10 mA for 1 minute (between VCC and FG terminals)
Insulation Resistance	DC 500V at 20 M Ω or higher (between VCC and FG terminals)

Chapter 2 – Specifications

2.1.2 Environmental

Ambient Operating Temperature	0° C to +50° C
Storage Temperature	-20° C to +60° C
Ambient Humidity	10% RH to 90% RH (no condensation, wet bulb temperature: 39° C max.)
Atmosphere	Pollution Degree 2
Air Purity (Dust)	0.1 mg/m ³ or less (non-conductive levels)
Corrosive Gasses	Free of corrosive gases
Atmospheric Pressure	800 hPa to 1114 hPa (2000 meters or lower)
Vibration Resistance	IEC61131-2 (JIS B 3501) compliant When vibration is NOT continuous 10 Hz to 57 Hz 0.075mm, 57 Hz to 150 Hz 9.8 m/s ² When vibration is continuous 10 Hz to 57 Hz 0.035mm, 57 Hz to 150 Hz 4.9 m/s ² X, Y, Z directions for 10 times (80 min.)
Noise Immunity (via noise simulator)	Noise Voltage: 1500 V _{p-p} Pulse Duration: 1 µs Rise Time: 1 ns

2.1.3 Structural

Grounding	100Ω or less, or your country's applicable standard ^{*1}
Ratings ^{*2}	Equivalent to IP65F (JEM 1030), NEMA #250 TYPE 4X/12
External Dimensions	W207 x H157 x D75.8 mm [W8.15 x H6.18 x D2.98 in.]
Weight	1.5 kg (3.3 lb) or less
Cooling Method	Natural air circulation

- 1 Grounding requirements differ from country to country. Confirm the requirements of your work environment prior to installation. For further information, please contact your Pro-face distributor.*
- 2 The front face of the LT unit is installed in a solid panel, and has been tested under conditions equivalent to the standards listed in the specifications. The LT unit's level of resistance is equivalent to these standards; however, oils that should have no effect on the LT can harm the unit — when vaporized oils are present, when low-viscosity cutting oils are allowed to adhere to the unit for long periods of time, or if the protective sheet on the front face of the LT peels off. These conditions can lead to the ingress of oil into the LT, and alternate protective measures are recommended. Also, the presence of non-approved oils may cause deformation or corrosion of the front panel's plastic cover. Therefore, prior to installing the LT, confirm the type of conditions that will be present in the LT unit's operating environment. If the installation gasket is used for a long period of time, or if the unit and its gasket are removed from the panel, the original level of the protection cannot be guaranteed. To maintain the original protection level, replace the installation gasket regularly.*

2.2 Functional Specifications

2.2.1 Display

	GLC150-BG41-*****-24V	GLC150-SC41-*****-24V
Type	Monochrome LCD	STN Color LCD
Resolution	320x240 pixels	
Effective Display Area	W115.2 x H86.4 mm [W4.54 x H3.40 in.]	W118.2 x H89.4 mm [W4.65 x H3.52 in.]
Colors	Blue mode (monochrome)	64 colors
Backlight	CFL (lifespan: more than 25,000 hours when continuously lit)	CFL (lifespan: more than 36,000 hours when continuously lit)
Contrast Adjustment Control	8 levels of adjustment available via touch panel.	
Language Fonts	ASCII: (Code page 850) Alphanumeric (incl. Eur. characters) China: (GB2321 – 80 codes) simplified Chinese fonts Japan: ANK158, Kanji: 6962 (JIS Standards 1&2) Korea: (KSC5601 – 1992 codes) Hangul fonts Taiwan: (Big 5 codes) traditional Chinese fonts	
Touch Panel	16x12 grid of touch panel keys (1 or 2 point touch)	
Text	8x8 dots	40 Char. x 30 rows
	8x16 dots	40 Char. x 15 rows
	16x16 dots	20 Char. x 15 rows
	32x32 dots	10 Char. x 7 rows
Display Sizes ^{*1}	8X8 dot font, 8X16 dot font, 16X16 dot font, and 32X32 dot font	
Font Sizes	Both height and width can be expanded 1, 2, 4, or 8 times.	

1 The display font will differ depending on which (language) character, or which size you select.

Reference Section 6.9 – “Font Setting”

Chapter 2 – Specifications

2.2.2 Memory

Application	1 MB FLASH EPROM (Approx. 320 screens at 3.2 KB/screen)
Data Backup	96 KB SRAM (uses lithium battery) ^{*1}

2.2.3 Control Memory

Variable Area	32 KB SRAM (uses lithium battery) ^{*1}
Program Area	128 KB FLASH EPROM

1 A Lithium battery's lifetime is:

- 10 years when the battery's ambient temperature is under 40° C
- 4.1 years when the battery's ambient temperature is under 50° C
- 1.5 years when the battery's ambient temperature is under 60° C

When used for backup - assuming 96 hours (4 days) to charge fully:

- Approximately 60 days with a fully-charged battery
- Approximately 6 days with a half-charged battery

2.2.4 Clock

Clock Accuracy	±65 seconds/month (at room temperature)
-----------------------	---



Note:

The LT unit's internal clock has a slight degree of error in accuracy. At normal operating temperatures and conditions, and with the LT operating from its lithium battery, the degree of error is ±65 seconds per month. Variations in operating conditions and battery life can cause this error to vary from -380 to +90 seconds per month. For systems where this degree of error will be a problem, the user should monitor this error and make adjustments as required.

2.2.5 External Interfaces

■ Serial Interface for Type C and Tool Connector (All Types)

Serial Interface	Asynchronous Transmission: RS-232C or RS-422 Data Length: 7 or 8 bits Stop Bit: 1 or 2 bits Parity: None, Odd, or Even Data Transmission Speed: 2400 bps to 115.2 kbps
Tool Connector	Asynchronous TTL level nonprocedural command I/F During Screen File (HMI interface) Development: <ul style="list-style-type: none">• used to transfer data between the LT application software/ C-Package and the LT unit During Operation: <ul style="list-style-type: none">• used for a variety of devices, including a bar-code reader

■ Flex Network Interface (Type B/Type B+/Type C)

Communication Type	1:N
Connection Method	Multi Drop
Transfer Distance	At 6 Mbps: 200 m per CH At 12 Mbps: 100 m per CH
Transfer Method	During cyclic period, distributed transmission, Half-duplex
Transfer Speed	6 Mbps (for 100 m), 12 Mbps (for 200 m)
Transfer I/F	Differential method, Pulse transfer resistance
Error Check	Format check, bit check, CRC-12 check
No. of Stations	63 (max.), 1008 I/O points (depending on type of units used.)

▼ **Reference** ▼ For detailed information, refer to the *Flex Network User Manual*.

■ Alarm Output for Circuit (All Types)

Turning the LT unit ON will start the unit's system software and the alarm output circuit's relay. When a major error triggers a watchdog timer alarm, however, this relay will turn OFF. Since an undefined LT input or output condition can occur, be sure to design an external failsafe circuit that will monitor the output of this relay.

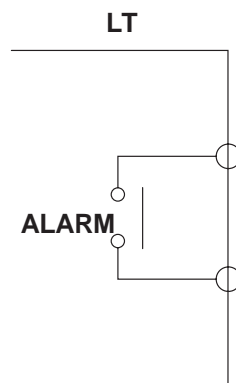


- **When the LT unit's power is turned ON, the Alarm Output is turned OFF for approximately 1 second. Therefore, be sure to design your circuits so that they disregard a 1 second Alarm Output stop after the LT unit's power is turned ON.**

Example: Insert an external timer in series with the Alarm Output that turns OFF 1.5 seconds after power is turned ON.

For circuit design examples, LT Series User Manual 2.2.5 External Interface ■ Alarm Output

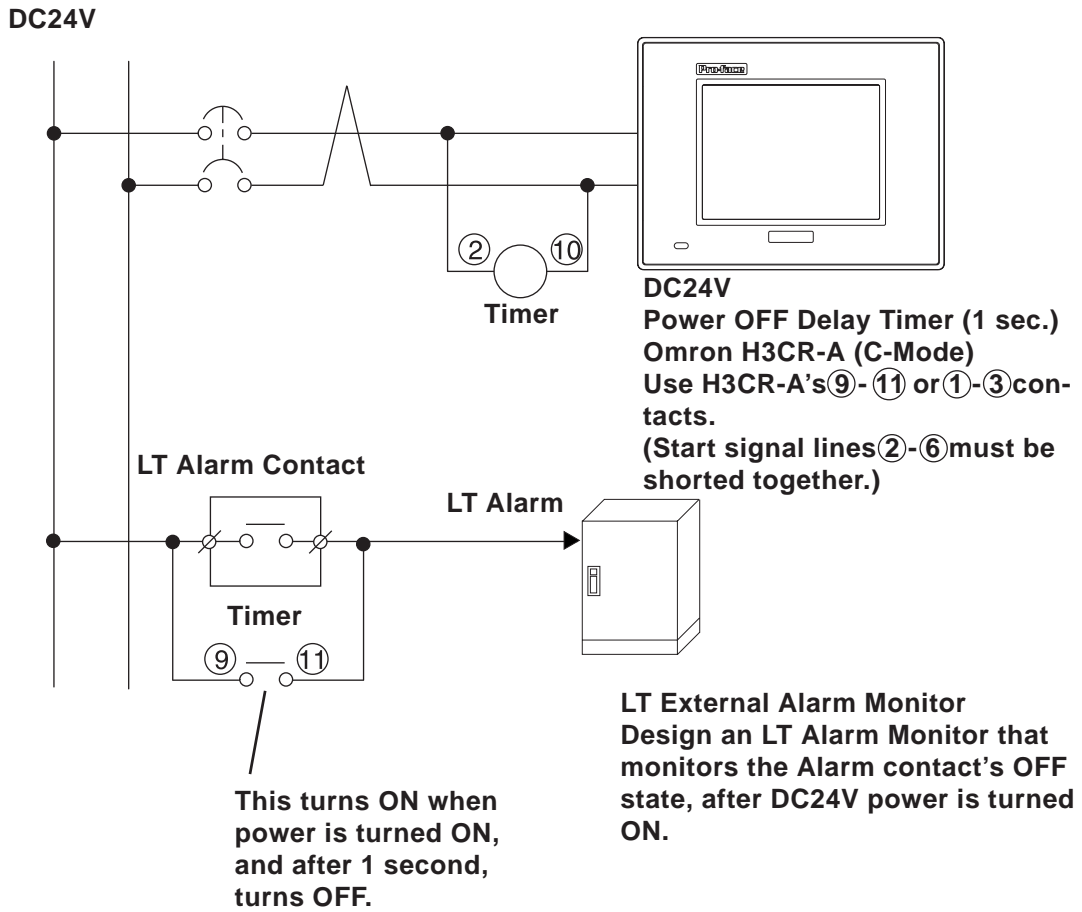
Contact Rating	0.15A – AC 125V Resistance Load 0.6A – DC 24V Resistance Load
Operating Time (Set Time at 20°C)	4ms or less
Recovery Hours (Reset Time is set at 20°C)	4ms or less
Minimum Switching Load	1mA / DC 5V
Initial Contact Resistance	100mΩ or less



Chapter 2 – Specifications

◆ OMRON Corporation Timer H3CR-A Circuit Drawing

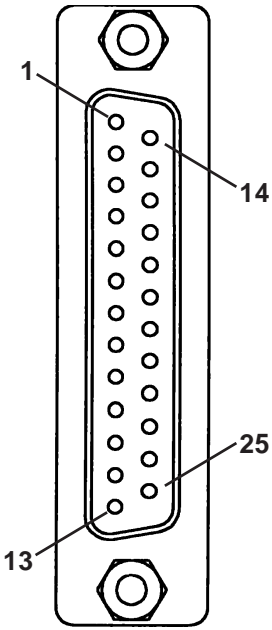
This Circuit uses a H3CR-A terminal number.



2.3 Interface Specifications

2.3.1 Serial Interface (Type C)

Either the RS-232C or RS-422 interface connects the LT to the external device.

Pin Assignments	Pin #	Signal Name	Condition
(D-Sub 25-pin female) SIO 	1	FG	Frame Ground
	2	SD	Send Data (RS-232C)
	3	RD	Receive Data (RS-232C)
	4	RS	Request Send (RS-232C)
	5	CS	Clear Send (RS-232C)
	6	NC	No Connection
	7	SG	Signal Ground
	8	CD	Carrier Detect (RS-232C)
	9	TRMX	Termination (RS-422)
	10	RDA	Receive Data A (RS-422)
	11	SDA	Send Data A (RS-422)
	12 ¹	RESERVE	Reserved
	13 ¹	RESERVE	Reserved
	14	VCC	5V ±5% Output 0.25 A
	15	SDB	Send Data B (RS-422)
	16	RDB	Receive Data B (RS-422)
	17	NC	No Connection
	18	CSB	Clear Send B (RS-422)
	19	ERB	Enable Receive B (RS-422)
	20	ER	Enable Receive (RS-232C)
	21	CSA	Clear Send A (RS-422)
	22	ERA	Enable Receive A (RS-422)
	23	NC	Not Connected
	24	NC	Not Connected
	25	NC	Not Connected

¹ The #12 and #13 pins are RESERVED. Do NOT connect to these pins.

Recommended Parts:

Connector: Dsub25pin plug XM2A-2501 (OMRON Corp.)

Cover: Dsub25pin cover XM2S-2511 (OMRON Corp.)

Jack Screws XM2Z-0071 (OMRON Corp.)



Use rough metric type M2.6x0.45 p threads used to secure the cable's set screws.

Cable: CO-MA-VV-SB5PX 28AWG (HITACHI Cable, Ltd.)

Reference To confirm the connection specifications for your external device, refer to the *LT Editor Device Connection Manual* (included with the LT Editor software), the *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software).

Chapter 2 – Specifications



Note:

Use the following instructions to create your own cable:

With the RS-422:

- The following pins must be connected in pairs, as follows:
#18 (CSB) <—> #19 (ERB)
#21 (CSA) <—> #22 (ERA)
- When connecting the RS-422 cable's #9 (TRMX) and #10 (RDA) pins, a termination resistance of 100 Ω is added between the #10 (RDA) and #16 (RDB) pins.
- When making a cable for a Memory Link system, use a 4-wire type of cable.

With the RS-232C:

- Do NOT use the following pins:
#9 (TRMX) #10 (RDA) #11 (SDA)
#15 (SDB) #16 (RDB) #18 (CSB)
#19 (ERB) #21 (CSA) #22 (ERA)

Connect the #1 (FG) terminal only if it is required by a connected device.




-
- **This LT unit's serial port is not isolated. To reduce the risk of damage to the RS-422 circuit, it is important that you connect the SG/GND (Signal Ground) terminals.**
 - **FG and SG terminals are internally connected in the LT. When connecting to another device, be sure to not create an SG shorting loop in your system.**
 - **Pin #14 (VCC) DC 5V Output is not protected. To prevent damage or unit malfunction, use only the designated level of current.**
-

2.3.2 Flex Network Interface (Type B/Type B+/Type C)

The following table specifies the signals of the Flex Network I/F Connector (included with the LT unit). Use these specifications to connect the LT to the Flex Network I/O unit using the Network Communication Connector included in the LT unit's packing box.

■ Flex Network I/F Connector

	Pin #	Signal Name	Condition
6	6	SLD	CH 2 Shield Line (SLD)
5	5	TR-	CH 2 Communication Data (TR-)
4	4	TR+	CH 2 Communication Data (TR+)
3	3	SLD	CH 1 Shield Line (SLD)
2	2	TR-	CH 1 Communication Data (TR-)
1	1	TR+	CH 1 Communication Data (TR+)

■ Flex Network Communication Cable

Use the following Flex Network Communication Cable when connecting to the Flex Network Unit.

Model	Length per Unit
FN-CABLE2010-31-MS	10 m
FN-CABLE2050-31-MS	50 m
FN-CABLE2200-31-MS	200 m

■ Flex Network Communication Connector

The Flex Network Communication Connector is included with the LT unit, and is also available as an optional maintenance item, such as FN-IFC01.

▼ **Reference** ▲ *Section 1.3 – “Accessories”*

*For detailed information about the Flex Network, refer to the **Flex Network User Manual**.*

Chapter 2 – Specifications

2.3.3 Input/Output Connector Interface (Type A1/Type A2/Type B+)

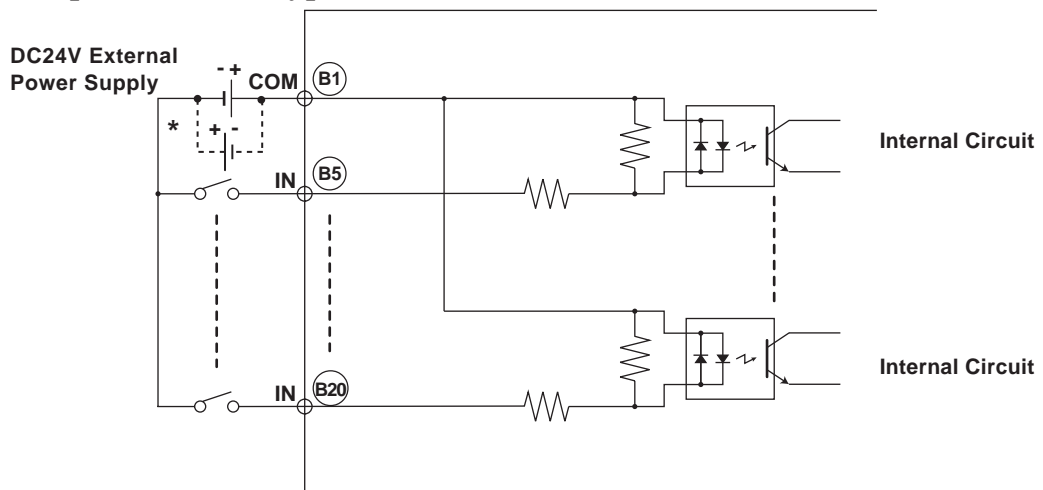
■ Input/Output Connector (Type A1)



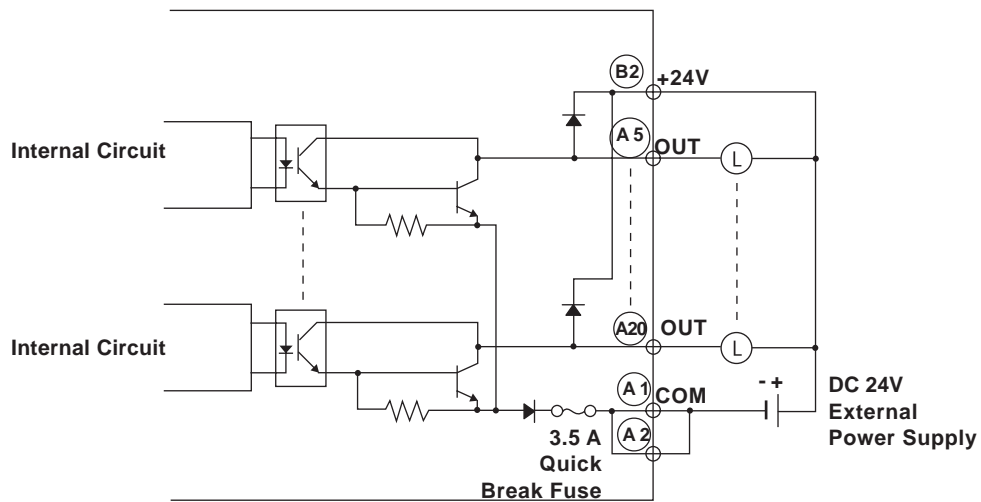
This connection drawing is as seen from the LT. The cable connector will use the A, B marks to show pin orientation. Be sure to check this orientation prior to creating your cable.

Pin	Signal Name	Pin	Signal Name	LT Connector
A1	COM (0V:DOUT)	B1	COM(24V:DIN)	
A2	COM (0V:DOUT)	B2	DC 24V(DOUT)	
A3	NC	B3	NC	
A4	NC	B4	NC	
A5	DOUT15	B5	DIN15	
A6	DOUT14	B6	DIN14	
A7	DOUT13	B7	DIN13	
A8	DOUT12	B8	DIN12	
A9	DOUT11	B9	DIN11	
A10	DOUT10	B10	DIN10	
A11	DOUT9	B11	DIN9	
A12	DOUT8	B12	DIN8	
A13	DOUT7	B13	DIN7	
A14	DOUT6	B14	DIN6	
A15	DOUT5	B15	DIN5	
A16	DOUT4	B16	DIN4	
A17	DOUT3	B17	DIN3	
A18	DOUT2	B18	DIN2	
A19	DOUT1	B19	DIN1	
A20	DOUT0	B20	DIN0	

◆ Input Circuit (Type A1) * Dotted line shows connection to source output type



◆ Output Circuit (Type A1)



◆ Input Specifications (Type A1)

Rated Voltage	DC 24V
Maximum Allowable Voltage	DC 26.4V
Input Method	Source/Sink Input
Rated Current	5 mA (24V)
Input Resistance	4.7 k Ω
Operation Range	ON Voltage: 21V or more OFF Voltage: 7V or less
Input Delay Time	OFF to ON: 10 ms or less ON to OFF: 10 ms or less
Common Lines	1
Common Lines Allocation	16 points/1 common line
External Connection	40-pin connector (used with Output section)
Input Points	16
Input Signal Display	LED lights when each point turns ON (logical side)
Status Display	None
Isolation Method	Photocoupler Isolation
External Power Supply	For Signal: DC 24V

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◆ Output Specifications (Type A1)

Rated Voltage	DC 24V
Rated Voltage Range	DC 24V \pm 10%
Output Method	Sink Output
Maximum Load Voltage	0.2 A/point 1.6 A/common
Output Voltage Drop	2.5V or less
Output Delay Time	OFF to ON: 2 ms or less ON to OFF: 2 ms or less
Voltage Leakage (when OFF)	0.4 mA or less
Type of Output	Transistor Output
Common Lines	1
Common Design	16 points/1 common line
External Connection	40-pin connector (also used for Input)
Output Protection Type	Output is unprotected
Internal Fuse	3.5 A, 125 V Chip Fuse (non-replaceable)
Surge Control Circuit	Diode
Output Points	16
Output Signal Display	LED lights when each point turns ON (logical side)
Status Display	None
Isolation Method	Photocoupler Isolation
External Power Supply	DC 24V

■ Input/Output Connector (Type A2)

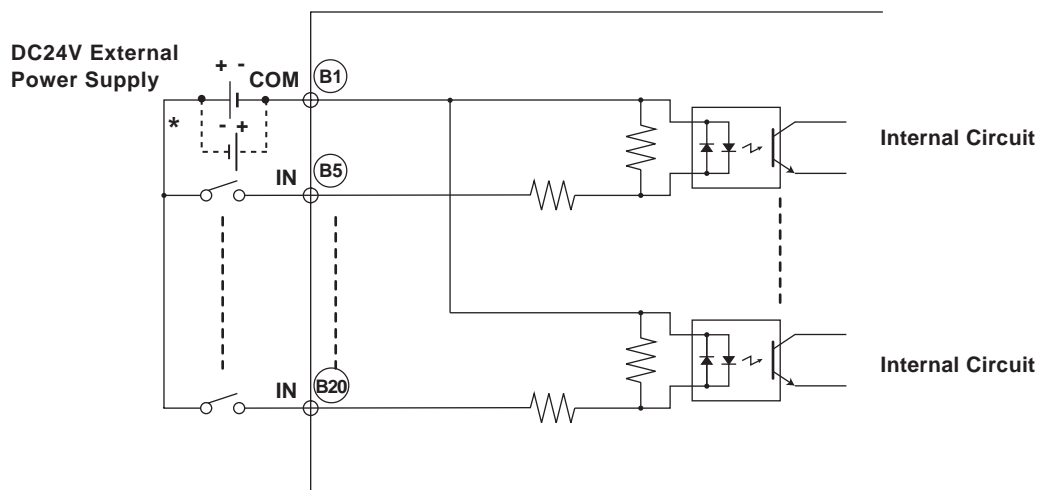


This connection drawing is as seen from the LT. The cable connector will use the A, B marks to show pin orientation. Be sure to check this orientation prior to creating your cable.

Pin	Signal Name	Pin	Signal Name	LT Connector
A1	COM (24V:DOUT)	B1	COM (0V:DIN)	
A2	COM (24V:DOUT)	B2	0V (DOUT)	
A3	NC	B3	NC	
A4	NC	B4	NC	
A5	DOUT15	B5	DIN15	
A6	DOUT14	B6	DIN14	
A7	DOUT13	B7	DIN13	
A8	DOUT12	B8	DIN12	
A9	DOUT11	B9	DIN11	
A10	DOUT10	B10	DIN10	
A11	DOUT9	B11	DIN9	
A12	DOUT8	B12	DIN8	
A13	DOUT7	B13	DIN7	
A14	DOUT6	B14	DIN6	
A15	DOUT5	B15	DIN5	
A16	DOUT4	B16	DIN4	
A17	DOUT3	B17	DIN3	
A18	DOUT2	B18	DIN2	
A19	DOUT1	B19	DIN1	
A20	DOUT0	B20	DIN0	

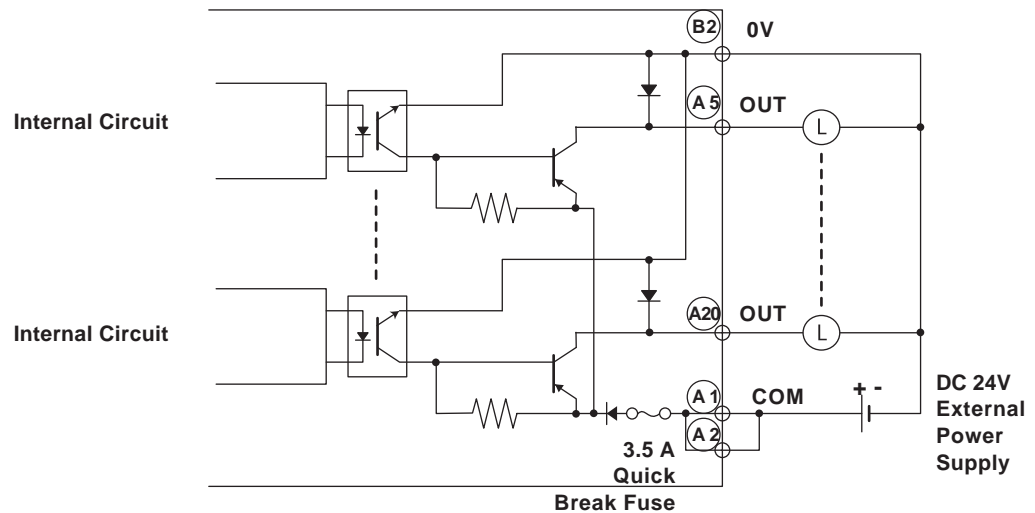
◆ Input Circuit (Type A2)

* Dotted line shows connection to sink output type



Chapter 2 – Specifications

◆ Output Circuit (Type A2)



◆ Input Specifications (Type A2)

Rated Voltage	DC 24V
Maximum Allowable Voltage	DC 26.4V
Input Method	Source/Sink Input
Rated Current	5 mA (24V)
Input Resistance	4.7 k Ω
Operation Range	ON Voltage: 21V or more OFF Voltage: 7V or less
Input Delay Time	OFF to ON: 10 ms or less ON to OFF: 10 ms or less
Common Lines	1
Common Lines Allocation	16 points/1 common line
External Connection	40-pin connector (used with Output section)
Input Points	16
Input Signal Display	LED lights when each point turns ON (logical side)
Status Display	None
Isolation Method	Photocoupler Isolation
External Power Supply	For Signal: DC 24V

◆ **Output Specifications (Type A2)**

Rated Voltage	DC 24V
Rated Voltage Range	DC 24V ±10%
Output Method	Source Output
Maximum Load Voltage	0.2 A/point 1.6 A/common
Output Voltage Drop	2.5V or less
Output Delay Time	OFF to ON: 2 ms or less ON to OFF: 2 ms or less
Voltage Leakage (when OFF)	0.4 mA or less
Type of Output	Transistor Output
Common Lines	1
Common Design	16 points/1 common line
External Connection	40-pin connector (also used for Input)
Output Protection Type	Output is unprotected
Internal Fuse	3.5 A, 125 V Chip Fuse (non-replaceable)
Surge Control Circuit	Diode
Output Points	16
Output Signal Display	LED lights when each point turns ON (logical side)
Status Display	None
Isolation Method	Photocoupler Isolation
External Power Supply	DC 24V

Chapter 2 – Specifications

■ Input/Output Connector (Type B+)

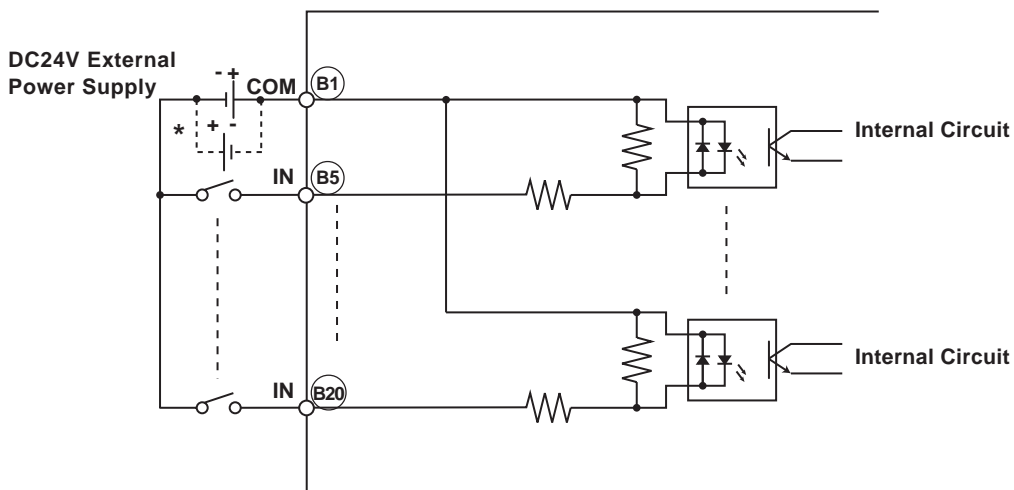


This connection drawing is as seen from the LT. The cable connector will use the A, B marks to show pin orientation. Be sure to check this orientation prior to creating your cable.

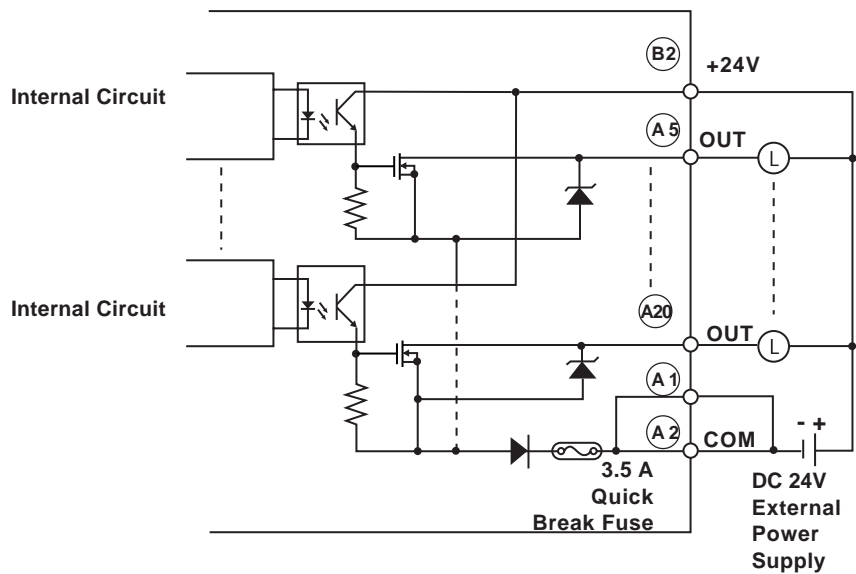
Pin	Signal Name	Pin	Signal Name	LT Connector
A1	COM (0V:DOUT)	B1	COM (24V:DIN)	
A2	COM (0V:DOUT)	B2	DC 24V (DOUT)	
A3	NC	B3	NC	
A4	NC	B4	NC	
A5	DOUT 15	B5	DIN15	
A6	DOUT 14	B6	DIN14	
A7	DOUT 13	B7	DIN13	
A8	DOUT 12	B8	DIN12	
A9	DOUT 11	B9	DIN11	
A10	DOUT 10	B10	DIN10	
A11	DOUT 9	B11	DIN9	
A12	DOUT 8	B12	DIN8	
A13	DOUT 7	B13	DIN7	
A14	DOUT 6	B14	DIN6	
A15	DOUT 5	B15	DIN5	
A16	DOUT 4	B16	DIN4	
A17	DOUT 3	B17	DIN3	
A18	DOUT 2	B18	DIN2	
A19	DOUT 1	B19	DIN1	
A20	DOUT 0	B20	DIN0	

◆ Input Circuit (Type B+)

* Dotted line shows connection to source output type



◆ Output Circuit (Type B+)



◆ Input Specifications (Type B+)

Rated Voltage	DC 24V
Maximum Allowable Voltage	DC 26.4V
Input Method	Source/Sink Input
Rated Current	5.7 mA (24V)
Input Resistance	4.2 k Ω
Operation Range	ON Voltage: 15V or more OFF Voltage: 5V or less
Input Delay Time	OFF to ON: 1.5 ms or less ON to OFF: 1.5 ms or less
Common Lines	1
Common Lines Allocation	16 points/1 common line
External Connection	40-pin connector (used with Output section)
Input Points	16
Input Signal Display	LED lights when each point turns ON (logical side)
Status Display	None
Isolation Method	Photocoupler Isolation
External Power Supply	For Signal: DC 24V

Chapter 2 – Specifications

◆ Output Specifications (Type B+)

Rated Voltage	DC 24V
Rated Voltage Range	DC 24V ±10%
Output Method	Sink Output
Maximum Load Voltage	0.2 A/point 1.6 A/common
Output Voltage Drop	1.5V or less
Output Delay Time	OFF to ON: 1ms or less ON to OFF: 1 ms or less
Voltage Leakage (when OFF)	0.1 mA or less
Type of Output	Transistor Output
Common Lines	1
Common Design	16 points/1 common line
External Connection	40-pin connector (also used for Input)
Output Protection Type	Output is unprotected
Internal Fuse	3.5 A, 125V Chip Fuse (non-replaceable)
Surge Control Circuit	Diode
Output Points	16
Output Signal Display	LED lights when each point turns ON (logical side)
Status Display Element	None
Isolation Method	Photocoupler Isolation
External Power Supply	DC 24V

■ Recommended Connectors and Covers

Digital has prepared sets of connectors and connector covers (GLC100-DIOCN01: 5 sets) and a ribbon cable crimp connector (GLC-DIOCN02: 5/set).

▼ **Reference** ▲ Section 1.3 – “Accessories”

For other types of connections, Pro-face recommends the items listed below.

Connection Method	Corresponding Connectors (manufactured by Fujitsu Takamisawa Component Limited)
Solder	FCN-361J040-AU (Connector) FCN-360C040-B (Cover)
Crimp	FCN-363J040 (Connector) FCN-363J040-AU/S (Contact) FCN-360C040-B (Cover)
Pressure Weld	FCN-367J040-AU/F (Contact) Recommended Cable: Flat Cable (1.27mm pitch) AWG#28 (Lay wire) / AWG#30 (Solid wire)

■ Recommended Wiring

Equivalent to AWG#22.

2.4 Part Names and Functions

A: Display Panel

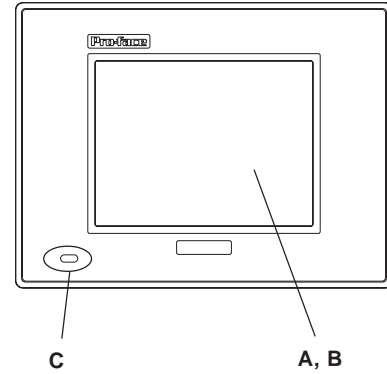
The LT monitor screen displays user-created screens and corresponding external device data.

B: Touch Panel

Enables the user to perform screen change operations or input data.

C: Status LED

Indicates the LT unit's current condition.



Color	Indicator	Operation Mode ^{*1}	Controller Operation Mode ^{*2}
Green	ON	OFFLINE	—————
	ON	In operation	RUN
	Flashing	In operation	STOP
Green and Red	Both ON	In operation	Backlight Burnout
Red	ON	In operation	Major Alarm (Stop)

¹ Operation Mode refers to a display and Touch Key feature.

² Controller Operation Mode refers to the feature that executes a logic program.

D: Power Input Terminal Block

Connects Power Cord or Frame Ground (FG).

E: Run/Stop Switch (When running, LED is ON)

Run: Executes logic program

Stop: Stops logic program

F: Alarm Output Circuit

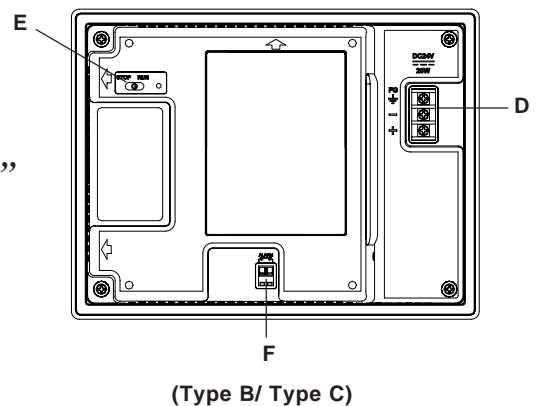
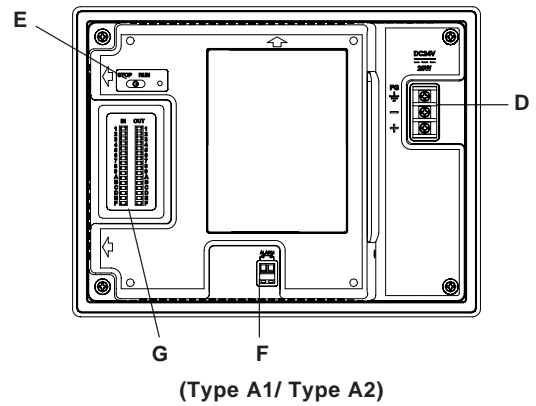
When a major error or a Watchdog Timer error occurs, it turns OFF (releases) the contact.

Reference Section 2.2.5 – “External Interface – Alarm Output”

G: Input/Output LED

(Type A1/Type A2/Type B+)

Displays the status of DIN/DOU.



Chapter 2 – Specifications

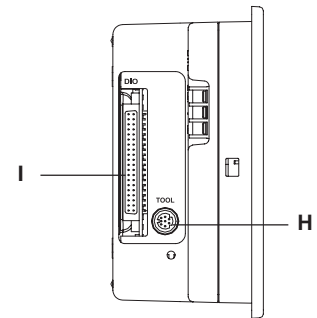
H: Tool Connector

Connects to Data Transfer Cable, Bar Code Reader.

I: Input/Output Connector (Type A1/Type A2/Type B+)

Connects external Input/Output units through the DIO connector.

The Type B+ unit's I/O connector occupies a single S-No. on the Flex Network.



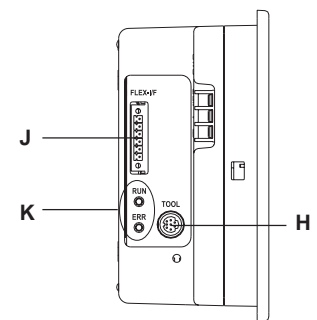
(Type A1 / Type A2)

J: Flex Network I/F (Type B/Type B+/Type C)

Connects I/O unit or Analog unit through the Flex Network Communication Cable

K: Flex Network Status LED (Type B/Type B+/Type C)

Flex Network I/F status LED will turn ON or flash, according to the unit's status.

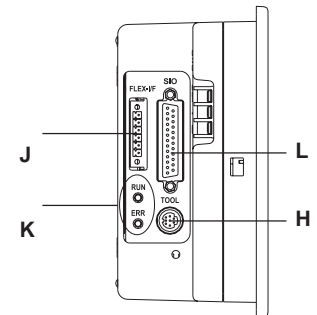


(Type B)

Status LED	Contents
RUN (Green)	Turns on when Communication is enabled.
ERR (Red)	Turns on when failure occurs in connected I/O Unit.

L: Serial Interface (Type C)

The RS-232C or the RS-422 Interface connects to an external device (Temperature Controller, Inverter, etc.)



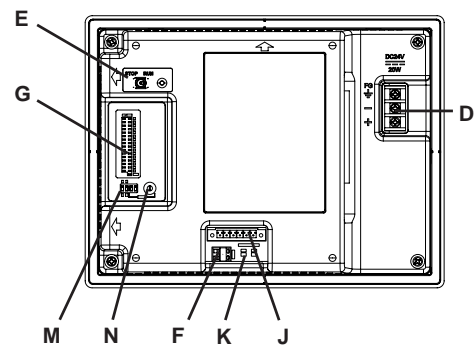
(Type C)

M: Dip Switches (Type B+)

These switches control the I/O connector's Output Hold. Also, they are used to set the S-No.'s left-most hex digit.

N: Rotary Switch (Type B+)

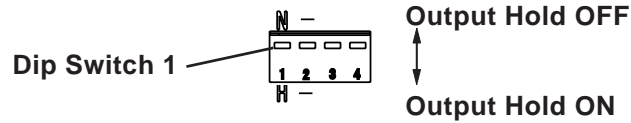
Used to set the S-No.'s right-most hex digit.



(Type B+)

■ Output Hold Settings

The left-most dip switch is used to turn this setting ON/OFF. The factory setting is OFF (No Hold)



◆ Output Hold ON (Hold)

When a communication error occurs, the unit will HOLD the output condition received in the previous communication cycle. When the next cycle is performed and the next command is successfully received, the output will then be changed.

◆ Output Hold OFF (Non-Hold)

When a communication error occurs, all outputs are reset to 0 (OFF). When normal communication is restored, the output is also restored.

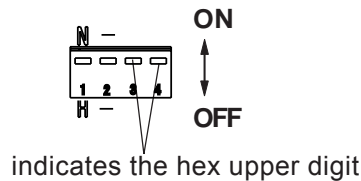


When the Logic Program is changed from RUN to OFFLINE mode, the output hold setting is turned OFF. Be sure to consider this before changing to OFFLINE mode, or resetting the unit. Also, when the unit is reset, the I/O signal OFF timing is not fixed.

■ S-No. (Station Number) Setting

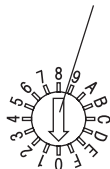
Station numbers from 1 to 63 are set in hexadecimal (01h to 3Fh) The factory setting is 01h.

The hex upper digit is controlled by the two dip switches (SW3, SW4) on the right side, via turning them ON/OFF.







The Rotary Switch's arrow tip indicates the station number's right-most hex digit (0 to F).

The arrow's tip indicates the position



Chapter 2 – Specifications

S-No. Setting Example

S-No.	Dip Switch		Rotary Switch
	the 2nd from the right	right side	
Base 10			
S-No. 16 (10h)	OFF (0)	ON (1)	0
			
S-No. 63 (3Fh)	ON (1)	ON (1)	F
			



- Do NOT change the S-No. while the unit is in RUN mode. Changing this number in RUN mode could cause a malfunction. Be sure to turn the power supply OFF prior to changing this setting.
- Be sure that S-No.s do not overlap.

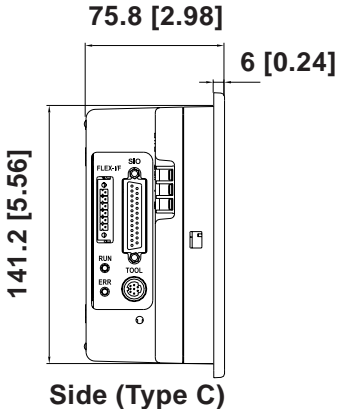
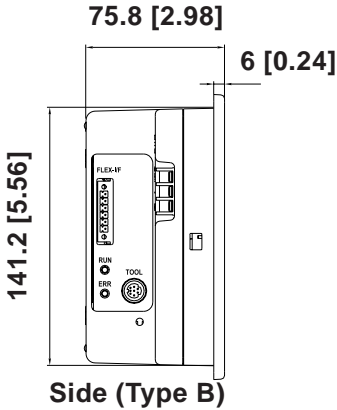
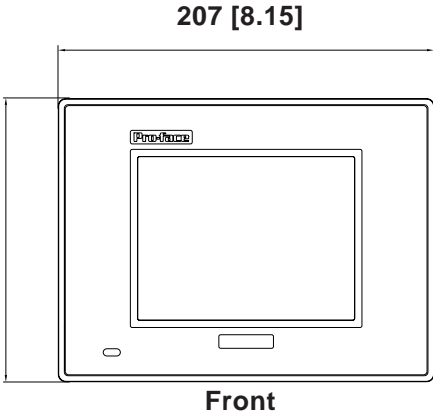
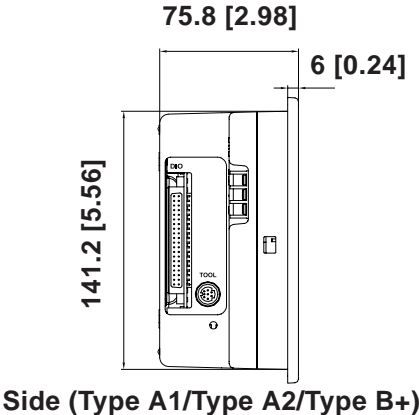
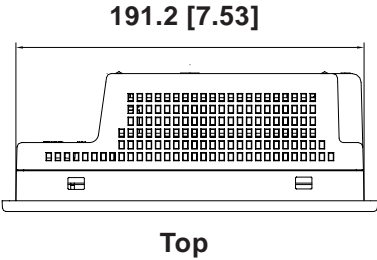


Use the Flex Network Driver settings to change the Flex Network data transfer speed.

2.5 Dimensions

2.5.1 LT External Dimensions

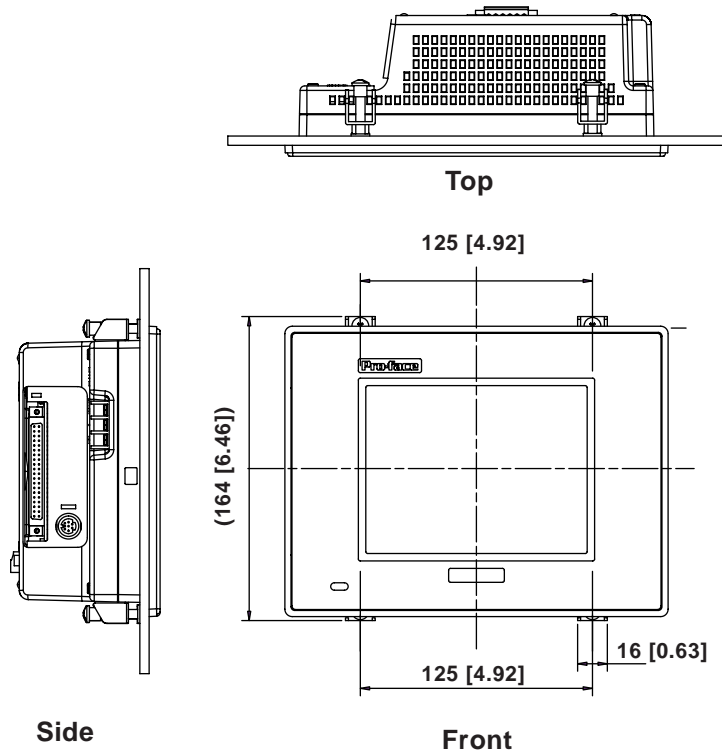
Unit: mm [in.]



Chapter 2 – Specifications

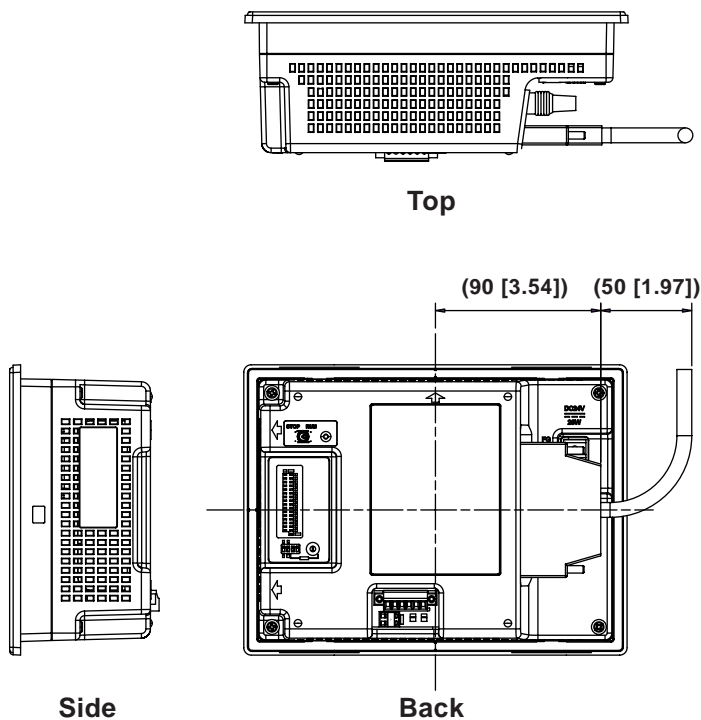
The following drawing shows the LT unit with installation fasteners.

Unit: mm [in.]



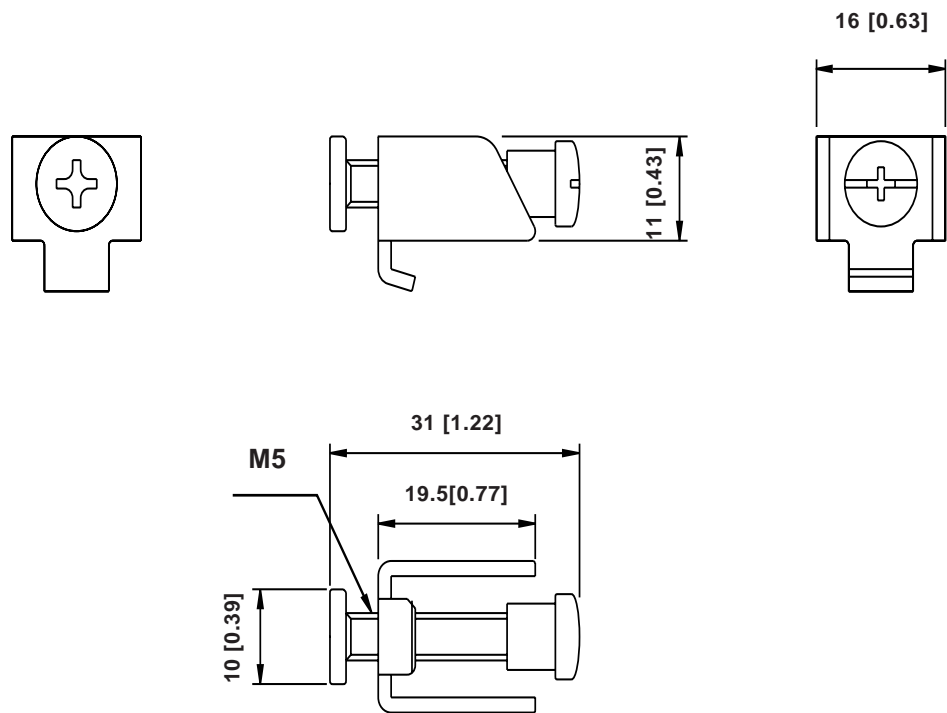
The following drawing shows the LT unit with cables.

Unit: mm [in.]



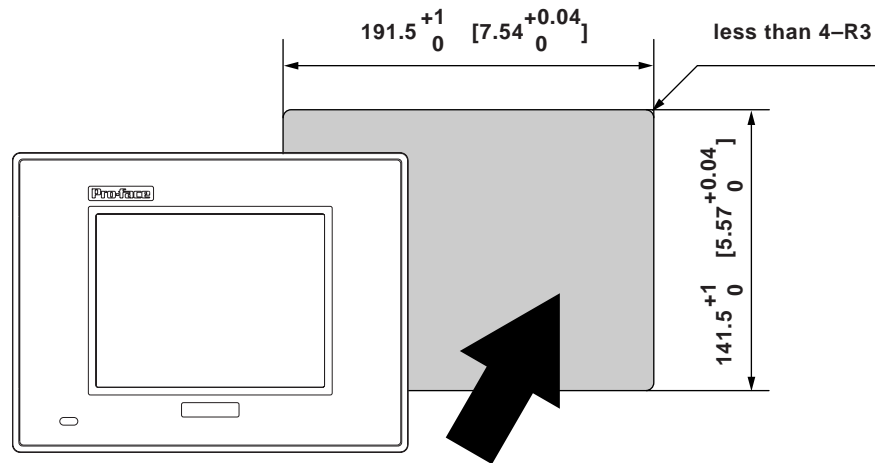
2.5.2 Installation Fasteners

Unit: mm [in.]



2.5.3 Panel Cut Dimensions

Unit: mm [in.]



Memo

Chapter

3 Installation and Wiring

1. Installation
2. Wiring Cautions
3. Tool Connector

3.1 Installation

Follow the steps in this section to install the LT.

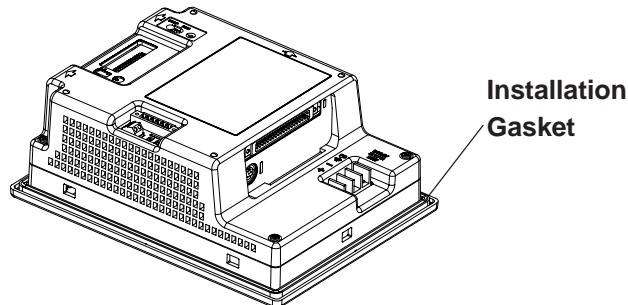
3.1.1 Installation Procedures

■ Attaching the Installation Gasket

Pro-face strongly recommends that you use the installation gasket to absorb vibration as well as repel water.

Place the display panel of the LT face down on a level surface. Make sure that the LT unit's installation gasket is securely fitted into the groove that runs around the perimeter of the panel's frame.

Reference *For details about installing the gasket, see Section 8.1.2 – “Installation Gasket Check/Replacement.”*



Before installing the LT into a cabinet or panel, check that the Installation gasket is securely attached to the unit.

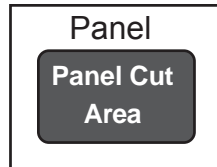
Chapter 3 – Installation and Wiring

■ Creating a Panel Cut

Create an opening with the correct dimensions to install the LT.

Reference For the correct installation dimensions, see *Section 2.5.3 – “LT Panel Cut Dimensions.”*

The installation gasket, installation fasteners, and attachment screws are all required when installing the LT.

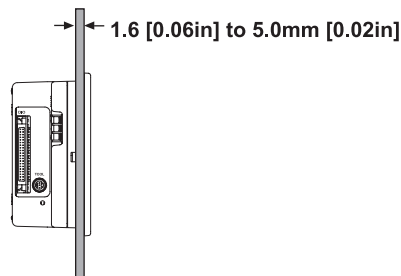


Note:

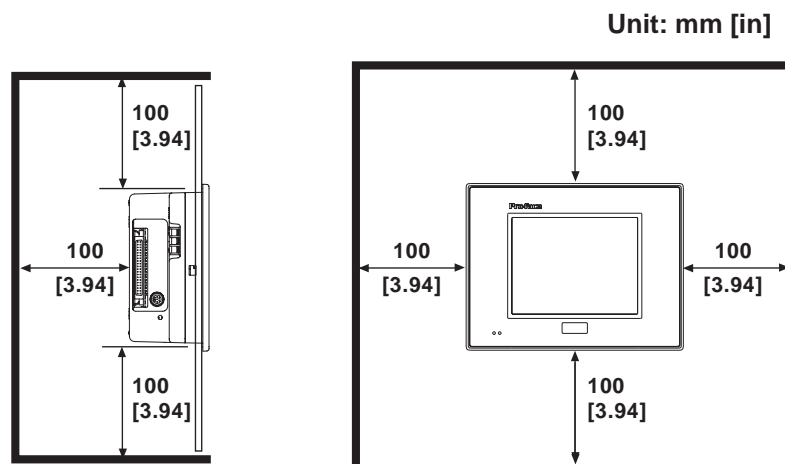
Make sure that the installation panel or cabinet's surface is flat, in good condition, and has no jagged edges. Metal reinforcement strips can also be attached to the inside of the panel, near the Panel Cut, to increase the panel's strength.



Panel thickness should be between 1.6 and 5.0 mm (0.06 to 0.02 in.), and should be based on the strength required to mount the LT to the panel.



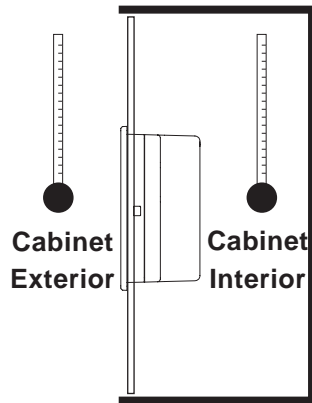
For easier maintenance and operation, and improved ventilation, install the LT at least 100 mm (3.94 in.) away from adjacent structures and other equipment.



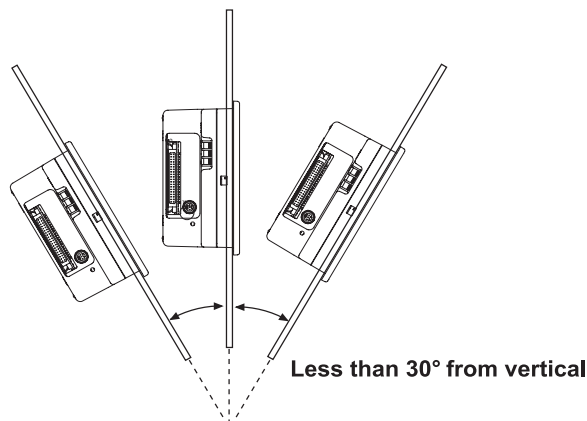


- To prevent accidents, be sure the Operating Temperature is from 0°C to 50°C, and the Ambient Humidity is from 10%RH to 90%RH (Wet bulb temperature of 39°C or less).

“Ambient operation temperature,” when referring to the installation of the LT in a cabinet or other enclosure, indicates the internal temperature of the cabinet or enclosure.



- Make sure that heat from surrounding equipment does not cause the LT to exceed its standard operating temperature.
- When installing the LT in a vertically-inclined panel, the panel's face should NOT incline more than 30°.

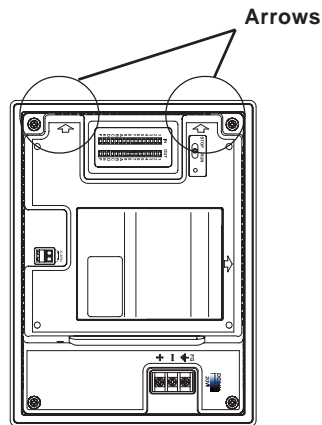


- When installing the LT in a vertically-inclined panel, and the panel's face inclines at an angle greater than 30°, the ambient temperature must NOT exceed 40° C. You may need to use forced air cooling to ensure the ambient operating temperature is lower than 40° C.

Chapter 3 – Installation and Wiring

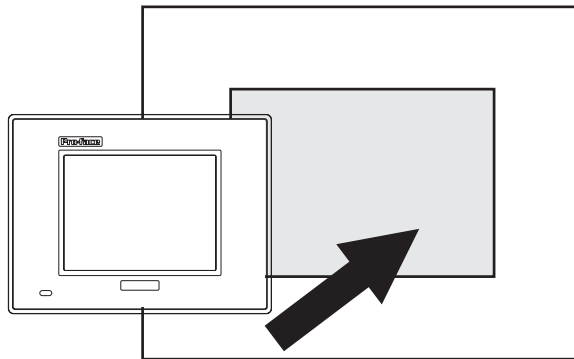


When installing the LT vertically, position the unit so that the arrows on the back of the LT point upwards.

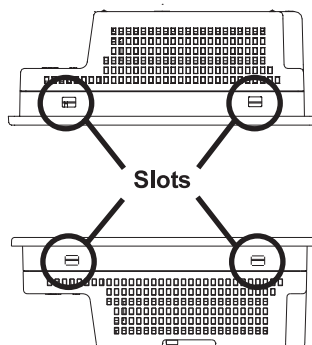


■ Installing the LT

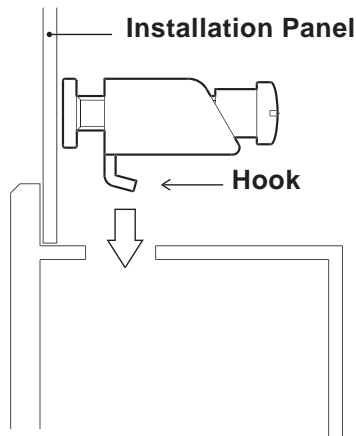
1. Insert the LT into the panel cutout, as follows:



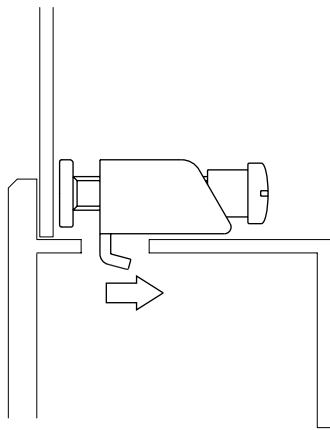
2. Insert the installation fasteners into the LT unit's insertion slots — two slots each, at the top and bottom of the unit (max. of 6, including sides).



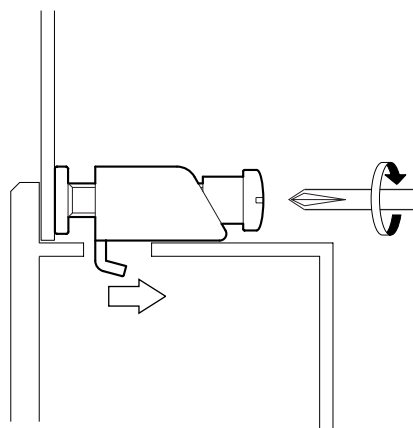
3. Insert each of the fasteners as follows.



4. Be sure to pull the fastener back until it is flush with the rear of the attachment hole:



5. Use a Phillips screwdriver to tighten each fastener screw and secure the LT in place.



A torque of only 0.5 to 0.6 N•m is sufficient to tighten these screws. Excessive force may damage the LT unit.



Depending on the condition of the panel, increasing the number of installation fasteners will raise the level of water resistance.

3.2 Wiring Cautions

3.2.1 Connecting the Power Cord



WARNINGS

- To avoid electrical shock, be sure the power cord is unplugged from the power outlet when connecting the power terminals to the LT unit.
- The LT requires a DC 24V power supply. If the power supply does not match the model, both the power supply and LT unit will be damaged.
- Reattach the LT Terminal Strip's clear plastic cover after the wiring is completed. If the cover is not installed, it may cause an electrical shock.
- Since the LT is not equipped with the power switch, be sure to connect a breaker type switch to the LT's power code.

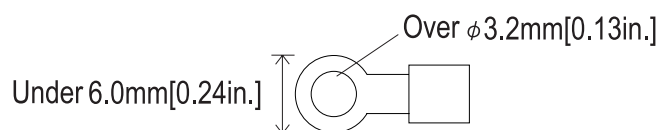


- To prevent the Ring Terminals^{*1} from short-circuiting when the terminal block attachment screws are loosened, use sleeve-type Ring Terminals.
- When the FG terminal is connected, be sure that the wire is grounded. Not grounding the LT unit will result in excessive noise. Use your country's applicable standard for grounding.

Reference Section 3.2.2 – “Grounding”



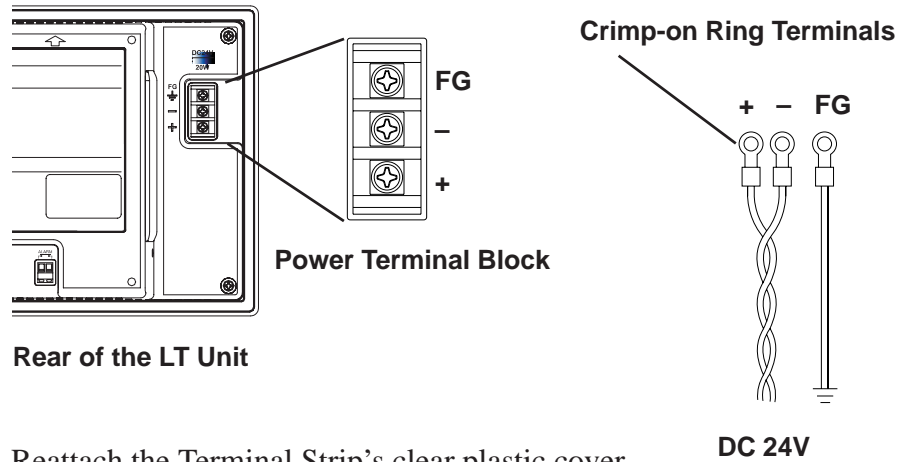
- Whenever possible, use thick wires (max. 2mm²) for power terminals, and twist the exposed wire ends when connecting the Ring Terminals.
- Use crimp-on type Ring Terminals in the following sizes:



¹ Recommended Ring Terminal: V2-MS3 (manufactured by JST).

■ Connecting the Power Supply Terminals

1. Make sure that the LT unit's power cord is not plugged in to the power supply.
2. Remove the Terminal Strip's clear plastic cover.
3. Remove the screws from the three (3) middle terminals, position the Ring Terminals (see below), and reattach the screws. Check each wire to make sure the connections are correct, and use only 0.5 to 0.6 N•m of force.



4. Reattach the Terminal Strip's clear plastic cover.

Chapter 3 – Installation and Wiring

3.2.2 Grounding

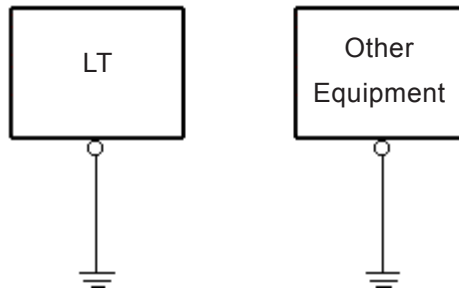


CAUTION

Do not use common grounding, since it can lead to an accident or machine breakdown.

Connect the FG terminal found on the back of the LT to an exclusive ground (diagram A).

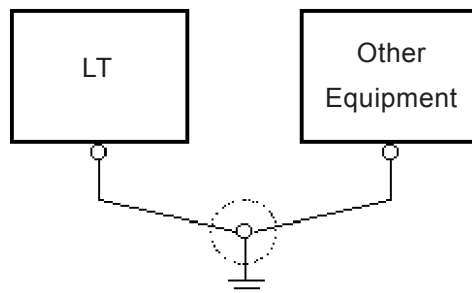
(A) Exclusive Grounding (BEST)



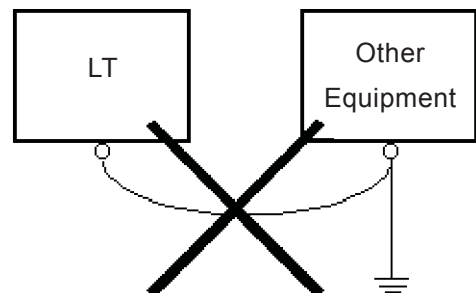
- Make sure that the grounding resistance is less than 100Ω.
- FG and SG terminals are internally connected in the LT. When connecting to another device, be sure to not create an SG shorting loop in your system.
- The grounding wire should have a cross-sectional area of at least 2mm². Create the grounding point as close to the LT unit as possible, and keep the wires as short as possible. Replace all thin wires with thicker wires, and place them in a duct.

If exclusive grounding is not possible, use a common connection point (dia. B).

(B) Common Grounding (OK)



(C) Common Grounding (Not OK)



If the equipment does not function properly when grounded, disconnect the ground wire from the FG terminal.

3.2.3 Flex Network Communication Cable

The following Flex Network Communication Cables are used to connect the LT unit to the Flex Network Unit (T-junctions cannot be used).

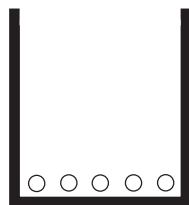
Model	Length
FN-CABLE2010-31-MS	10m
FN-CABLE2050-31-MS	50m
FN-CABLE2200-31-MS	200m

Reference For detailed information about Flex Network cables or Flex Network units, refer to the *Flex Network User Manual*.

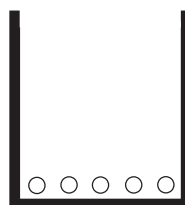
3.2.4 I/O Signal Line Cautions

To help prevent noise and interference problems, separate all control, communication and power lines by placing them in a separate ducts.

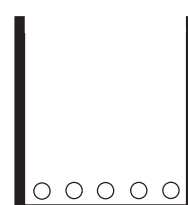
Duct for I/O Signal Lines



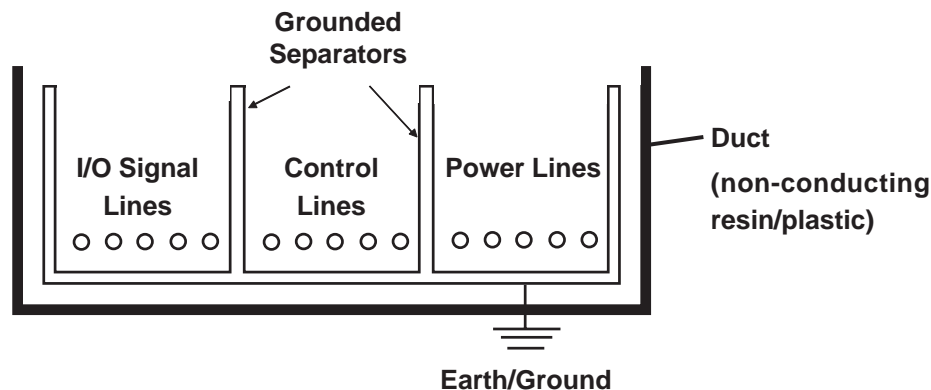
Duct for Control Lines



Duct for Power Lines



If different wires must be placed in the same duct, separate them with an earthed/grounded divider.



Note: If the lines cannot be separated, use shielded lines and create a ground from the shield line.



- Use noise-reducing external wiring methods to increase overall system reliability.
- To prevent power surges or noise interference, use ducts to separate all DC I/O or current circuit wires from communication cables.
- To prevent malfunctions due to noise, communication cables must be wired separately from high-frequency lines and power lines such as high-voltage lines, high-current lines, and inverters.

3.2.5 Installation Cautions

A problem in the external power supply or an LT unit failure can lead to operation failures.

Since these types of failures can affect the entire system, as a preventive measure, be sure to set up a protection circuit (such as an Emergency Stop, Protection Network, Interlock, or System Design Circuit) in areas where potential failures may occur.

Examples of protection circuits that ensure the system's reliability include the following:

■ Failsafe Electrical Circuits

When designing failsafe circuits, be aware of possible malfunctions resulting from differences in the startup times of the control device connected to LT output unit (especially the DC power supply), the LT unit's system, and the program. When using a remote I/O, create a logic program to check the terminal status.

For example, connect an electrical voltage relay coil to the LT output unit power supply circuit and to any connected control devices' power circuit, then connect their contacts to the LT input unit. Design the circuit so that it checks for an ON signal from the electrical voltage relay using a logic program, then executes the ladder program of the control device connected to the LT output unit.

■ Input Voltage

The power supply must be DC 24V (between DC 20.4V and DC 28.8V).

■ Power Interruptions

When a power supply interruption is 10 ms or longer, the LT unit's power will also stop. Also, when a power interruption occurs, operation will stop even while a command is being issued.

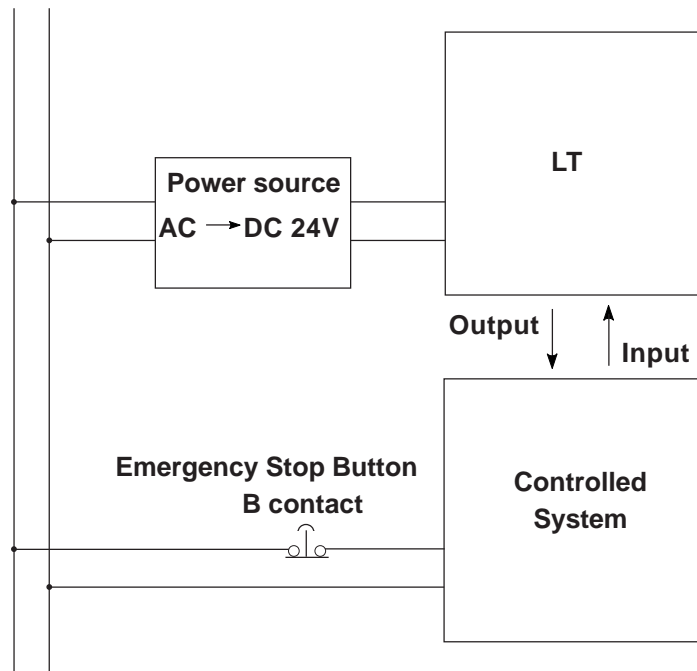
For example, if the power is cut while an FMOV command is sending data in 100-word units, command execution will stop.

When designing the program, allow for the possibility of a power interruption.

■ Emergency Stop Circuits

Do NOT send an Emergency Stop signal to the LT, and do NOT use the LT unit's internal software to process an Emergency Stop signal.

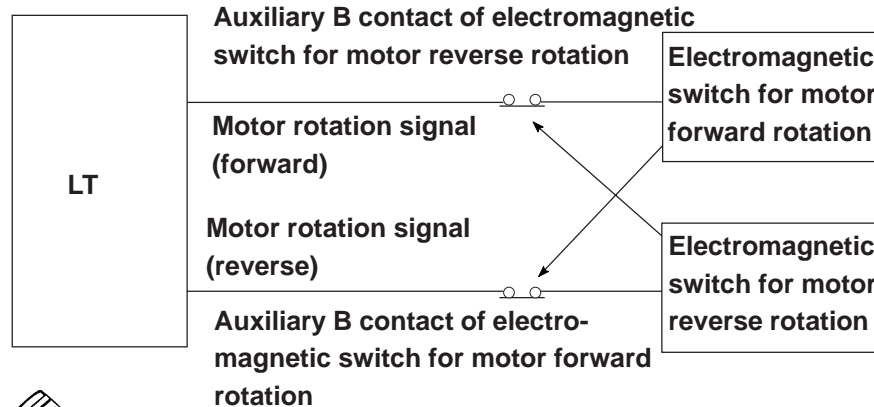
As shown below, be sure to create the Emergency Stop circuit outside the LT.



Chapter 3 – Installation and Wiring

■ Interlock Circuit 1

Create an interlock circuit outside the LT (below), to control a motor's forward/reverse rotation circuit using an LT or external device connection.



Note:

After the LT or external device runs the program, the timing of the ON/OFF signals to the output device is carried out simultaneously.

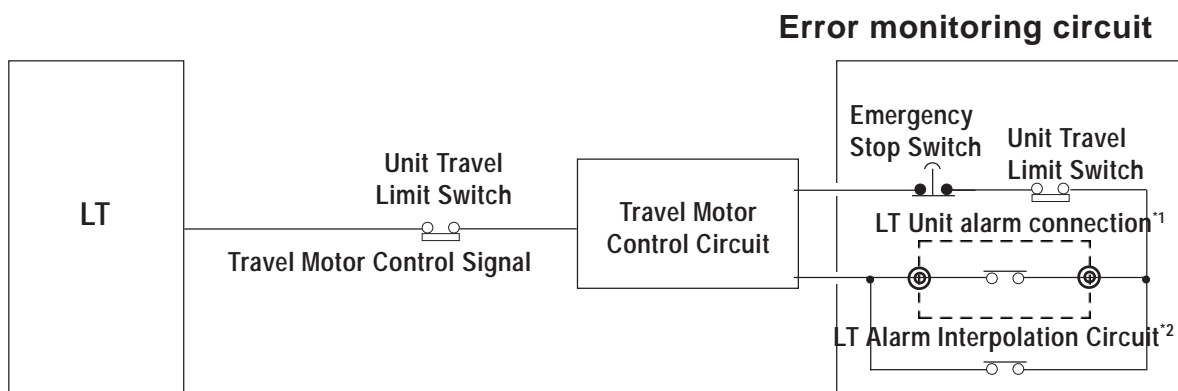
For example, an electromagnetic switch for forward and reverse motor rotation could be turned ON and OFF at the same time. Therefore, when the main contact for the power circuits of both the forward and the reverse motor rotation are turned ON and OFF at the same time, there is a possibility that an R Phase and a T Phase short circuit will occur. Please use the above interlock, or a mechanical interlock equipped with an electromagnetic switch, when designing a forward/reverse rotation circuit.

■ Interlock Circuit 2

If there is a possibility that an LT failure could cause an accident, use an external hardware device to include a failsafe element in the design of the interlock circuit.

For example, if the system first needs to stop the Travel Motor whenever the Unit Travel Limit Switch is activated, include the Unit Travel Limit Switch in the LT input. The following circuit uses a hardware method to ensure that the Travel Motor is stopped.

This applies to hardware; do NOT rely on software to process the interlock design.



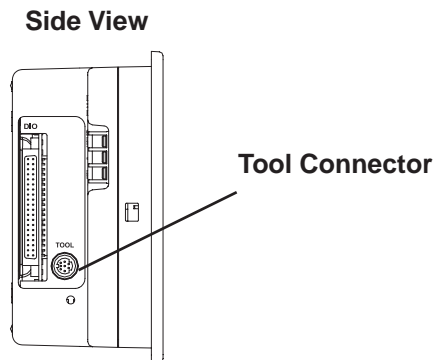
- 1 When the LT discovers major errors such as Watchdog Timer Error, set up the LT unit's alarm so that it turns all relay output OFF.
- 2 The relay output remains OFF until the LT system starts. In this case, the external supervisory monitoring circuit has to recognize that the LT is not yet operating.

3.3 Tool Connector

A data transfer cable or a bar-code reader can be attached to the LT unit's tool connector. A serial printer can be connected with a data transfer cable and a user-customized conversion cable. The location of the LT unit's tool connector is shown in the following diagram.


WARNING

To prevent electrical shock, unplug the LT unit's power cord from the main power supply prior to attaching or detaching any LT connectors.



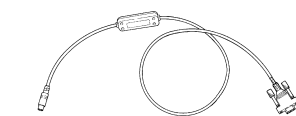
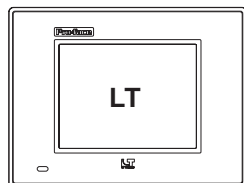
When the Bar Code Reader uses a separate power supply:

- Turn the Bar Code Reader ON before turning the LT ON.
- Turn the LT OFF before turning the Bar Code Reader OFF.

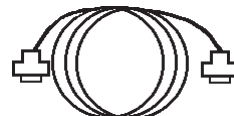
3.3.1 Serial Printer Connection

■ Overview

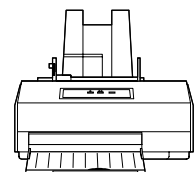
The LT unit outputs to a printer via the tool interface. Use the optional data transfer cable to connect to the user-customized conversion cable, and connect that cable to the serial printer's connector.



Data Transfer Cable



**Conversion Cable
(user-created)**



Serial Printer

Chapter 3 – Installation and Wiring

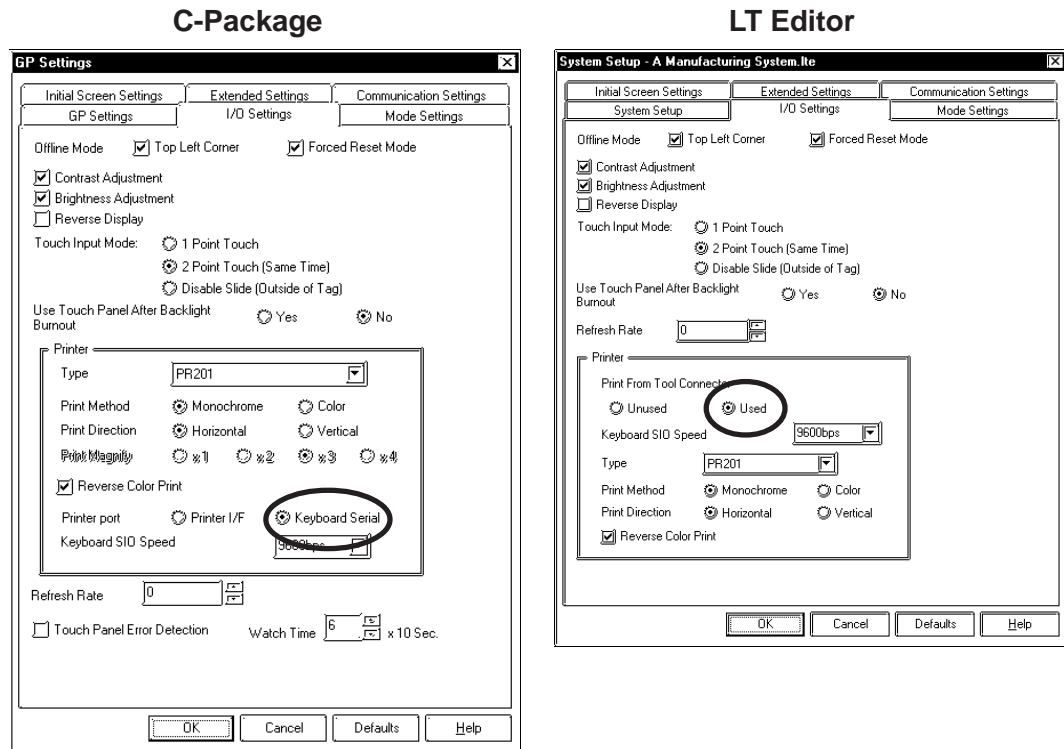
■ Project Manager Setup

Select [Screen/Setup]-[System Setup] in the Project Manager. The printer output can be executed via Tool Connector by configuring the settings on the I/O Settings tab of the [System Setup] dialog box as shown below.

C-Package: Select the Keyboard Serial option for the Printer port setting.

LT Editor: Select the Used option for the Print from Tool Connector setting.

Depending on the connected serial printer, the Type setting and the Keyboard SIO Baud Rate setting will differ.



■ Data Transfer Cable (Dub 9-Pin) Specification

The data transfer cable (Model: GPW-CB02) uses a socket-type connector. The cable's pins are assigned as follows:

Pin Assignments	Pin No.	Signal Name
	1	DTR
	2	TXD
	3	RXD
	4	DSR
	5	GND
	6	RTS
	7	CTS
	8	RTS
	9	

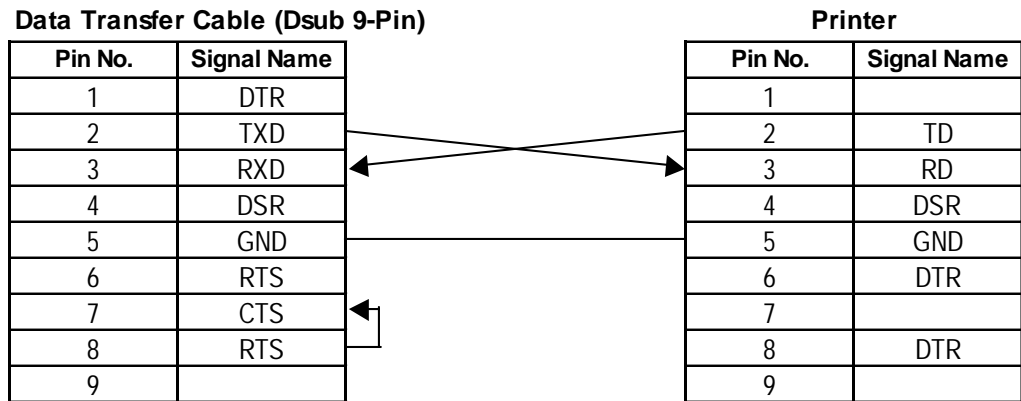


Note: Use inch type set screws (#4-40 UNC).

Chapter 3 – Installation and Wiring

■ HP Laser Jet 4PJ Printer

◆ Conversion Cable Wiring Diagram



◆ Printer Type Settings Area – Type and Keyboard SIO Baud Rate

Type: HP Laser Jet II

Keyboard SIO Baud Rate: 9600bps

◆ Printer Settings

Serial	RS-232
Protocol	Xon/Xoff
Baud Rate	9600
RobustXon	OFF
DTR Polarity	HI

Font Source	I (build-in)
Font No.	1
Size	12
Symbol	WIN3.1

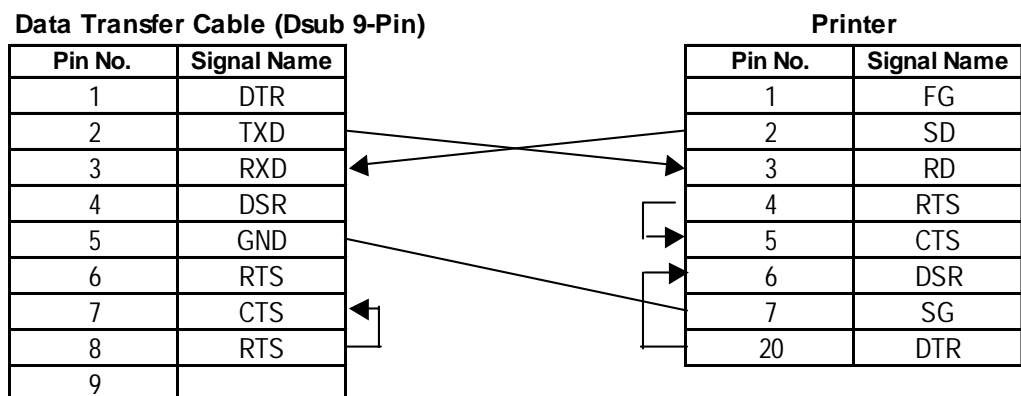
Resolution	600
Serial	PCL
Timeout	15

◆ Available Printout Features

Printout Features	Availability		
	Japanese	I-ASCII	Korean / Taiwanese / Chinese
Screen Hard Copy	0	0	0
Print Alarm Message	0	0	0
Real-time Log Data Print	0	0	0
Print Log Data (Single Block)	0	0	0

■ NADA Electronics TP-651G Printer (Ver. 1.3)

◆ Conversion Cable Wiring Diagram



Chapter 3 – Installation and Wiring

◆ Printer Type Settings Area – Type and Keyboard SIO Baud Rate

Type: Epson (High Quality)

Keyboard SIO Baud Rate: 19200bps

Printing Method: monochrome

◆ Printer Settings

DIP SW1

Switch	Feature	ON/OFF
SW1-1	LISTER P PRINT	OFF
SW1-2	Buffer Full Print	OFF
SW1-7	Graphic Double Height Printing	ON
SW1-8	Exclusive Graphic 800 x 600 dot printing	OFF

DIP SW2

Switch	Feature	ON/OFF
SW2-1	Baud Rate: 19200bps	ON
SW2-2		ON
SW2-3	Data Bit Length: 8 bits	OFF
SW2-4	Parity: Invalid	OFF
SW2-5	Parity: EVEN	OFF
SW2-6	Stop Bit 1 bit	OFF
SW2-7	XON/XOFF TYPE	ON
SW2-8	Print Interval: 1 second	OFF

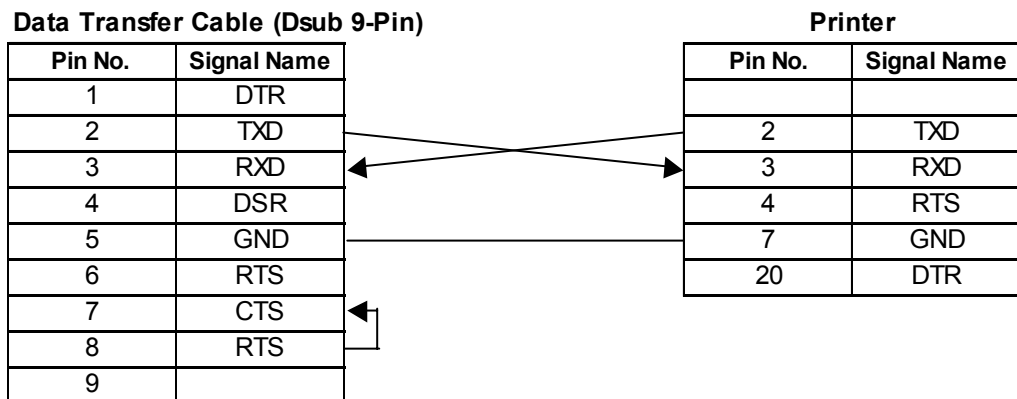
◆ Available Printout Features

The printout features available with the LT unit are listed as follows:

Printout Features	Availability		
	Japanese	I-ASCII	Korean / Taiwanese / Chinese
Screen Hard Copy	0	0	0
Print Alarm Message	0	0	0
Real-time Log Data Print	0	0	0
Print Log Data (Single Block)	0	0	0

■ EPSON TM-U210D Printer

◆ Conversion Cable Wiring Diagram



Chapter 3 – Installation and Wiring

◆ Printer Type Settings Area – Type and Keyboard SIO Baud Rate

Type: EPSON (High Quality / High Speed)

Keyboard SIO Baud Rate: 9600bps

◆ Printer Settings

DIP Switch Set 1

Switch	Function	ON/OFF
SW1-1	Data reception error	Prints "?" marks
SW1-2	Receive buffer capacity	Approx. 1K bytes
SW1-3	Handshaking	XON/XOFF
SW1-4	Word length	8bits
SW1-5	Parity check	No
SW1-6	Parity selection	Odd
SW1-7	Baud rate	9600bps
SW1-8	Busy condition	Sets the printer to BUSY when it is offline or when the receive buffer is full

DIP Switch Set 2

Switch	Function	ON/OFF
SW2-1	Print column selection 7x9 font / 9x9 font	40/33
SW2-2	Internal use. Setting must not be changed (fixed to OFF).	
SW2-3	Internal use. Setting must not be changed (fixed to OFF).	
SW2-4	Undefined.	
SW2-5	Internal use. Setting must not be changed (fixed to OFF).	
SW2-6	Internal use. Setting must not be changed (fixed to OFF).	
SW2-7	I/F pin 6 reset signal	Disabled
SW2-8	I/F pin 25 reset signal	Enabled

◆ Available Printout Features

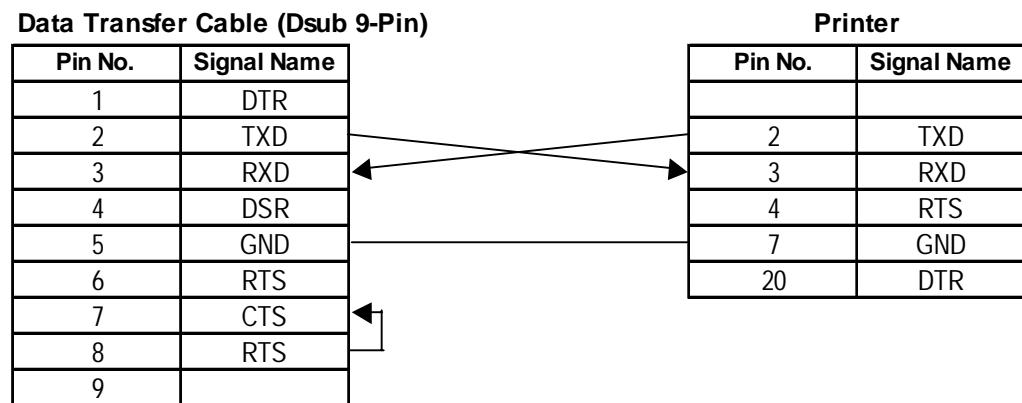
Printout features available with the LT unit are as follows:

Printout Features	Availability		
	Japanese	I-ASCII	Korean / Taiwanese / Chinese
Screen Hard Copy	X	X	X
Print Alarm Message	X	O	X
Real-time Log Data Print	X	O	X
Print Log Data (Single Block)	X	O	X

Chapter 3 – Installation and Wiring

■ CUSTOM FT190SP Printer

◆ Conversion Cable Wiring Diagram



◆ Printer Type Settings Area – Type and Keyboard SIO Baud Rate

Type: Epson (High Quality/High Speed)

Keyboard SIO Baud Rate: 19200bps

◆ Printer Settings

SET UP DEFAULT:

40 COLUMNS (font 9x24)

PRINT = REVERSE

MODE = LITTLE

FONT 2

CR-LT IGNORE CR

SPEED/CURRENT = LOW

BUFFER 1K BYTE

SERIAL PORT SELECTED

BAUD RATE = 9600

PROTOCOL = 8, N, 1

FLOW CONTROL = XON-XOFF

PRINT KEY TRANSMIT \$0D

◆ Available Printout Features

The following table lists printout features available with the I-ASCII font.

Japanese, Korean, Taiwanese, and Chinese fonts are not available.

Printout Features	Availability		
	Japanese	I-ASCII	Korean / Taiwanese / Chinese
Screen Hard Copy	X	X	X
Print Alarm Message	X	O	X
Real-time Log Data Print	X	O	X
Print Log Data (Single Block)	X	O	X

Chapter

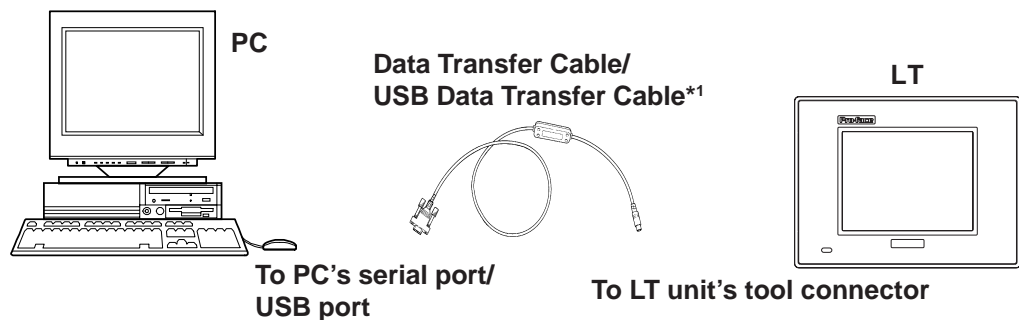
4 Data Transfer

1. SERIAL DATA TRANSFER
2. OFFLINE Mode Main Menu
3. INITIALIZATION

This chapter explains how to transfer data created with the LT Editor/C-Package to or from the LT unit. Transfer data via the data transfer cable between the LT and the PC.

4.1 Data Transfer Cable

The following diagram illustrates the connection between your PC and the LT with the data transfer cable.



Sending the project file to the LT requires the Data Transfer cable (GPW-CB02), which is sold separately.

Also, the I/F conversion adapter is not included with the LT. However, if necessary, you can purchase this adapter at a computer supply store.



- Pro-face's serial data transfer cable (GPW-CB02) and USB data transfer cable (GPW-CB03) are sold separately. However, the data transfer cable package does NOT include the PC's interface conversion adapter.
- When using the PC with the Dsub 25-pin socket (female) interface, a connector conversion adapter is required. Use the straight-line type of conversion adapter.
Recommended adapters:
Abel Co. AA833
Sanwa Supply Co. D09-9F25F
- When using a PC equipped with a half-pitch, 14-pin socket interface, a conversion adapter is required.
Recommended adapter:
Loas Co. ZR01-024

1 Software version limitations apply.

Reference For details, *USB Data Transfer Cable Installation Guide*.

4.2 Transferring Screen Data

Transfer screen data from your PC via the LT Editor/C-Package.

Reference For details about the operation of the LT Editor/C-Package, refer to the *LT Editor Operation Manual – Screen Creation Guide* (included with the LT Editor software) and the *GP-PRO/PBIII Operation Manual* (included with the C-Package software).

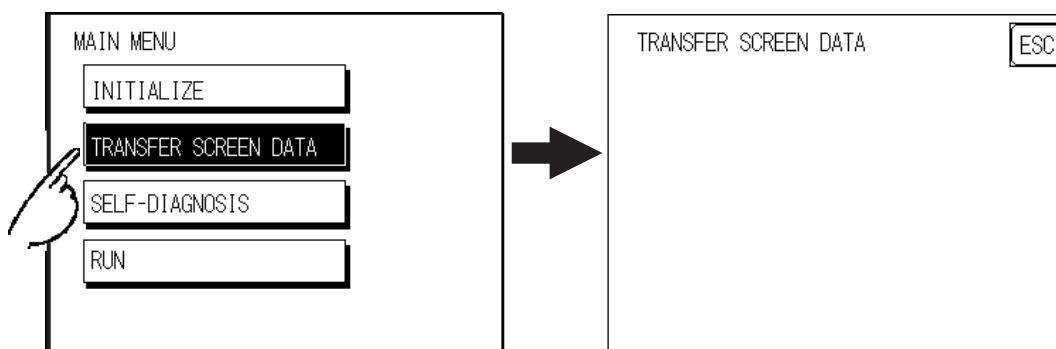
■ Transferring Data to a New LT

Connect the LT to your PC with the data transfer cable, and then turn the LT ON. The “Read me first” screen appears on the LT unit, and then automatically changes to the TRANSFER SCREEN DATA screen. After this screen appears, you can transfer screen data from the LT Editor/C-Package to the LT.



■ Completing Data Transfer*1

When transferring screen data from the LT Editor/C-Package, the screen automatically switches to TRANSFER SCREEN DATA. If the screen does not switch to TRANSFER SCREEN DATA, select TRANSFER SCREEN DATA mode.



1 The LT must be prepared for the data transfer process before the data can be transferred. To do this, be sure to download the system program and the protocol program from the LT Editor/C-Package to the LT.

During data transfer, the SETUP TRANSFER, NOW TRANSFERRING – PLEASE WAIT, and NOW WRITING – PLEASE WAIT messages appear. When these messages disappear, the screen data transfer is completed.

When the screen data transfer is completed, if you do not need to set up the LT, the screen designated in INITIALIZE | SCREEN SET UP | INITIAL SCREEN NO. appears, and the screen changes to operation (RUN) mode.

You can cancel data transfer at any time using your LT Editor/C-Package software's Transfer screen.



Interrupting the screen data transfer can lead to an LT startup error.

During screen data transfer, do NOT:

- **disconnect the LT unit's power supply**
 - **turn off the PC**
 - **disconnect the LT unit's transfer cable**
-



If the LT Editor/C-Package's SYSTEM SETUP data is transferred to the LT, the OFFLINE mode INITIALIZE data will be overwritten.

Memo

Chapter 5 OFFLINE Mode

1. Entering OFFLINE Mode
2. OFFLINE Mode Main Menu
3. INITIALIZATION
4. SELF-DIAGNOSIS

OFFLINE Mode provides access to the LT unit's Initialize menu, Self-Diagnosis menu, and other LT features. You need to change the LT to OFFLINE mode before you can use any of these features.



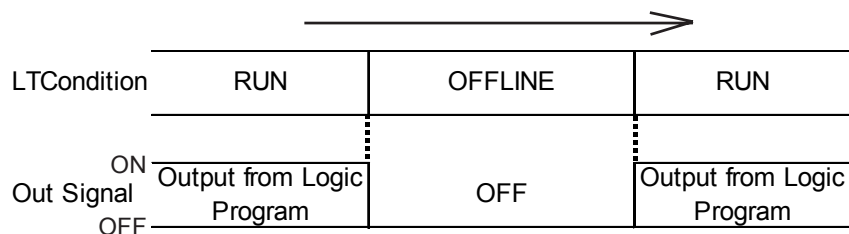
OFFLINE mode is unavailable in a new LT until the necessary System data has been transferred from your LT Editor/C-Package. To transfer system data, the LT must be ON. When the screen data files are transferred from the LT Editor/C-Package to the LT, the System screen data is also automatically sent.

Reference For information about transferring data to the LT, refer to the *LT Editor Operation Manual – Screen Creation Guide* (included with the LT Editor software) and the *GP-PRO/PBIII Operation Manual* (included with the C-Package software).

5.1 Entering OFFLINE Mode



- When the Logic Program is changed from RUN to OFFLINE mode, the output hold setting is turned OFF. Be sure to consider this before changing to OFFLINE mode, or resetting the unit. Also, when the unit is reset, the I/O signal OFF timing is not fixed.
- Be aware that when changing a Logic Program from RUN to OFFLINE mode, regardless of the current output hold setting, the LT unit's and the I/O signals' processing is as follows:

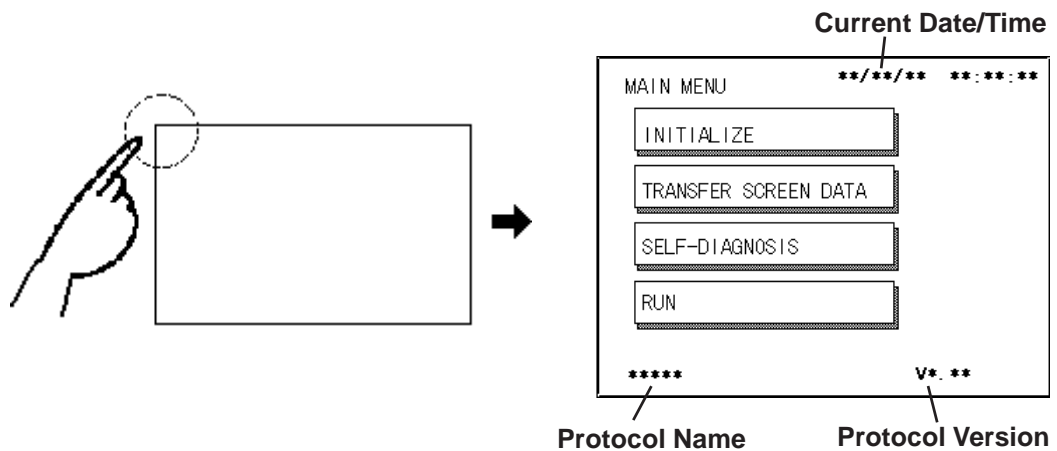


In order to initialize the LT or perform any self-diagnostics, you must change the LT to OFFLINE mode. The following explanation explains the two ways to enter this mode.

Chapter 5 – OFFLINE Mode

5.1.1 After Plugging in the Power Cord

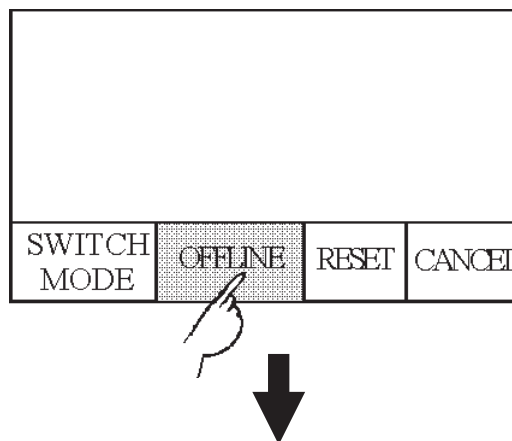
To enter OFFLINE mode, touch the top-left corner of the screen within 10 seconds after connecting the LT unit's power cord.



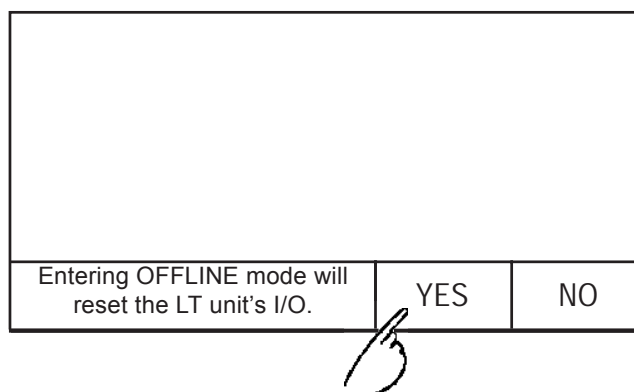
5.1.2 From the Menu Bar

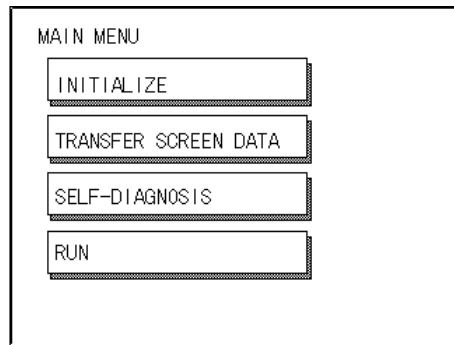
From the LT unit's menu bar, touch OFFLINE, and the Main Menu appears.

Reference To call up the Menu Bar, see *Section 6.4.3 – SET UP TOUCH PANEL.*



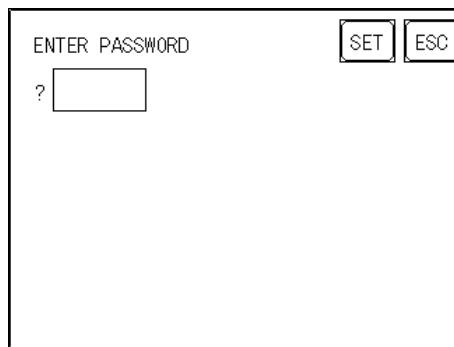
Entering OFFLINE mode will reset the LT unit's I/O. After confirming that this will not cause any problems, touch YES.





Enter the Password, then touch SET to enter OFFLINE mode.

If you try to enter a Password in the INITIALIZE | SET UP SYSTEM area before entering OFFLINE mode, the following screen appears:



Reference *For more information about Passwords, see Section 6.3.1 – “SYSTEM SETUP.”*

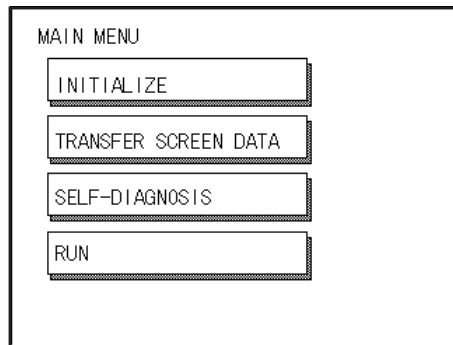
For information about Entering Password Numbers, see Section 5.3 – “INITIALIZATION.”

5.2 OFFLINE Mode - Main Menu

The Main Menu contains the following menu items: INITIALIZE, TRANSFER SCREEN DATA, SELF-DIAGNOSIS, and RUN.

The settings for each menu item, below, must match the corresponding external device, for the LT to communicate properly.

Entering OFFLINE mode calls up the following screen.



Select the desired menu item by touching the corresponding option.
Each Main Menu item is used as follows:

INITIALIZE

Setup items control the LT unit.

SCREEN DATA TRANSFER

Transfers screen data between the LT Editor/C-Package and the LT.

SELF-DIAGNOSIS

Checks to see if there are any problems with the LT System or Interface (I/F).

RUN

Starts the LT operation.

Reference For more information about INITIALIZE, see **Chapter 6 – “Initializing the LT”**.

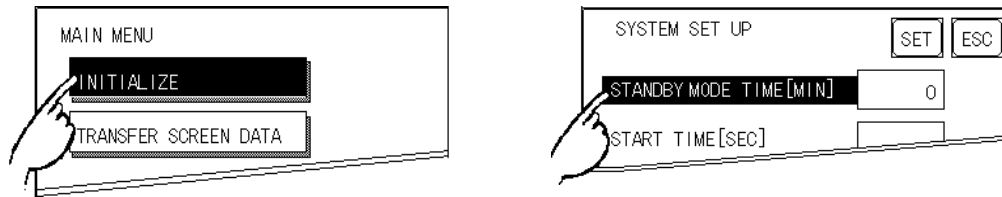
For more information about TRANSFER SCREEN DATA, refer to the **LT Editor Operation Manual – Screen Creation Guide** (included with the LT Editor software) and the **GP-PRO/PBIII Operation Manual** (included with the C-Package software).

For more information about the SELF-DIAGNOSIS and RUN features, see **Chapter 7 – “LT Run Mode and Errors.”**

5.3 INITIALIZATION

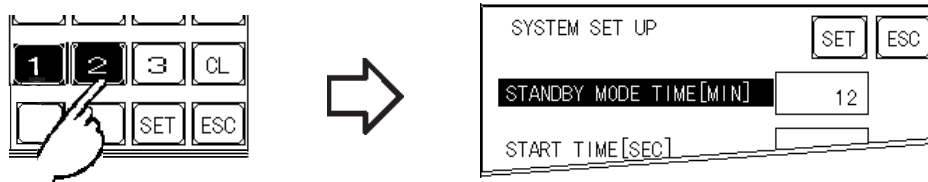
■ Selecting Menu and Setting Items

Touch a menu item to select that menu; touch a setting item to select its input field.



■ Entering Numbers

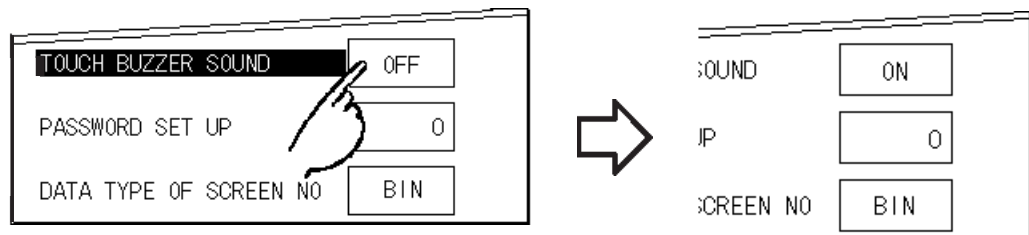
After selecting an input field, touch the numeric touch keys located at the bottom of the screen to enter the value of the selected item. After entering each input field's numeric value, touch the [SET] key to register the value.



■ Selecting Setup Conditions

After selecting a menu item, touch the setting option to highlight the item, and touch the setting area to set the condition for that item.

In this example, touching the ON/OFF area toggles the TOUCH BUZZER SOUND setting, which is set to OFF, and then switched to ON.



Chapter 5 – OFFLINE Mode

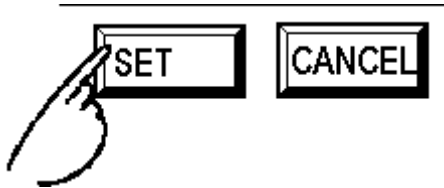
■ After Entering All Setting Data

Touch the top-left [SET] key to write the setup data to the Internal FEPRM.



After entering the Setup data, do NOT touch the screen until the previous menu reappears. Writing the Setup conditions to the Internal FEPRM is a process that requires a short period of time to complete.

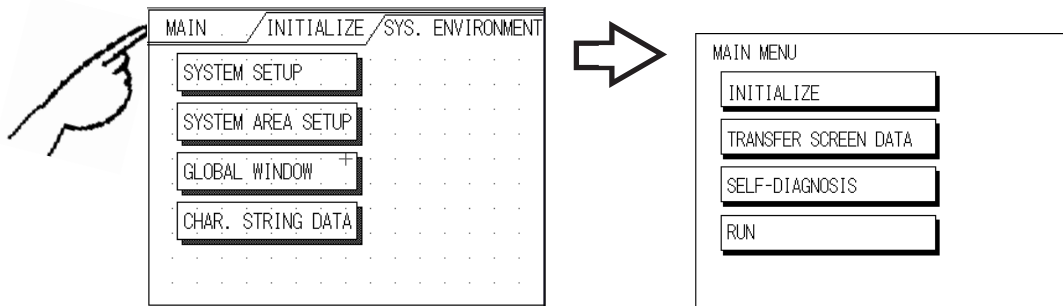
Touch [CANCEL] to cancel the setup, exit the screen without saving the changes, and return to the previous menu.



■ Returning to a Previous Screen

Touch the tab to call up the desired menu.

For example, to return to the MAIN MENU from the SYS. ENVIRONMENT screen, touch the MAIN MENU tab.



5.4 SELF-DIAGNOSIS

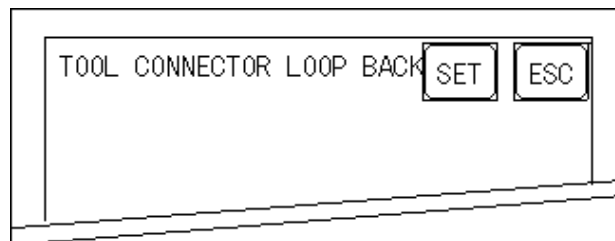
■ Selecting a Sub-Menu

Touch the desired menu item, and that sub-menu appears.



■ Using the [SET] and [ESC] Keys

After selecting the Self-Diagnosis item, the [SET] and [ESC] keys may appear at different times at the top of the screen.



◆ [SET] Key

When the [SET] key is touched, the Self-Diagnosis test begins.

◆ [ESC] Key

When the [ESC] key is touched, the Self-Diagnosis test is cancelled, and the SELF-DIAGNOSIS menu returns.

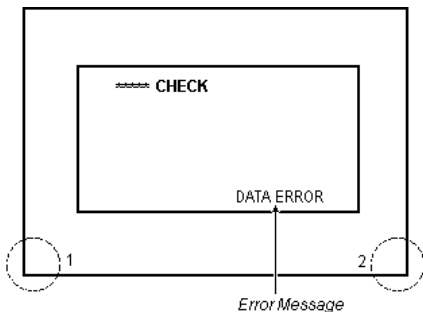
Chapter 5 – OFFLINE Mode

■ Returning to the SELF-DIAGNOSIS Menu

After performing the Self-Diagnosis check, OK is displayed. Touch once anywhere on the display screen to return to the SELF-DIAGNOSIS MENU.

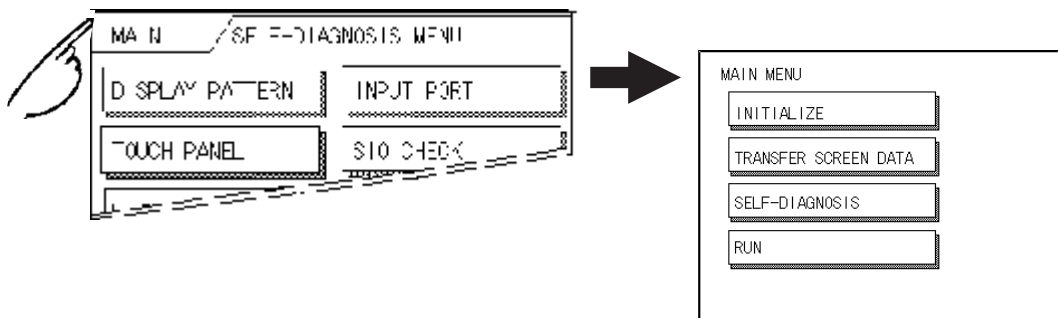


If an Error Message displays, press the bottom-left corners of the panel [1], and then touch the bottom-right corner of the panel [2] to return to the SELF-DIAGNOSIS MENU.



■ Returning to the Main Menu

Touch the MAIN tab in the top-left corner of the SELF-DIAGNOSIS menu to return to the MAIN MENU.



Chapter

6 Initializing the LT

1. Initialization Screen
2. Initialization Items
3. SYSTEM ENVIRONMENT SETUP
4. SET UP I/O
5. OPERATION ENVIRONMENT SETUP
6. INITIALIZE INTERNAL MEMORY
7. SET UP TIME
8. SET UP SCREEN
9. FONT SETTING

6.1 Initialization Screen

To change your LT unit's general operation settings, use the LT unit's OFFLINE mode to access the items in the MAIN MENU | INITIALIZE option.



Note:

When you transfer your LT Editor/C-Package's system file¹, the LT operates using that file's data. If the LT System file is correctly set up and transferred, then setting up the INITIALIZE settings is unnecessary.



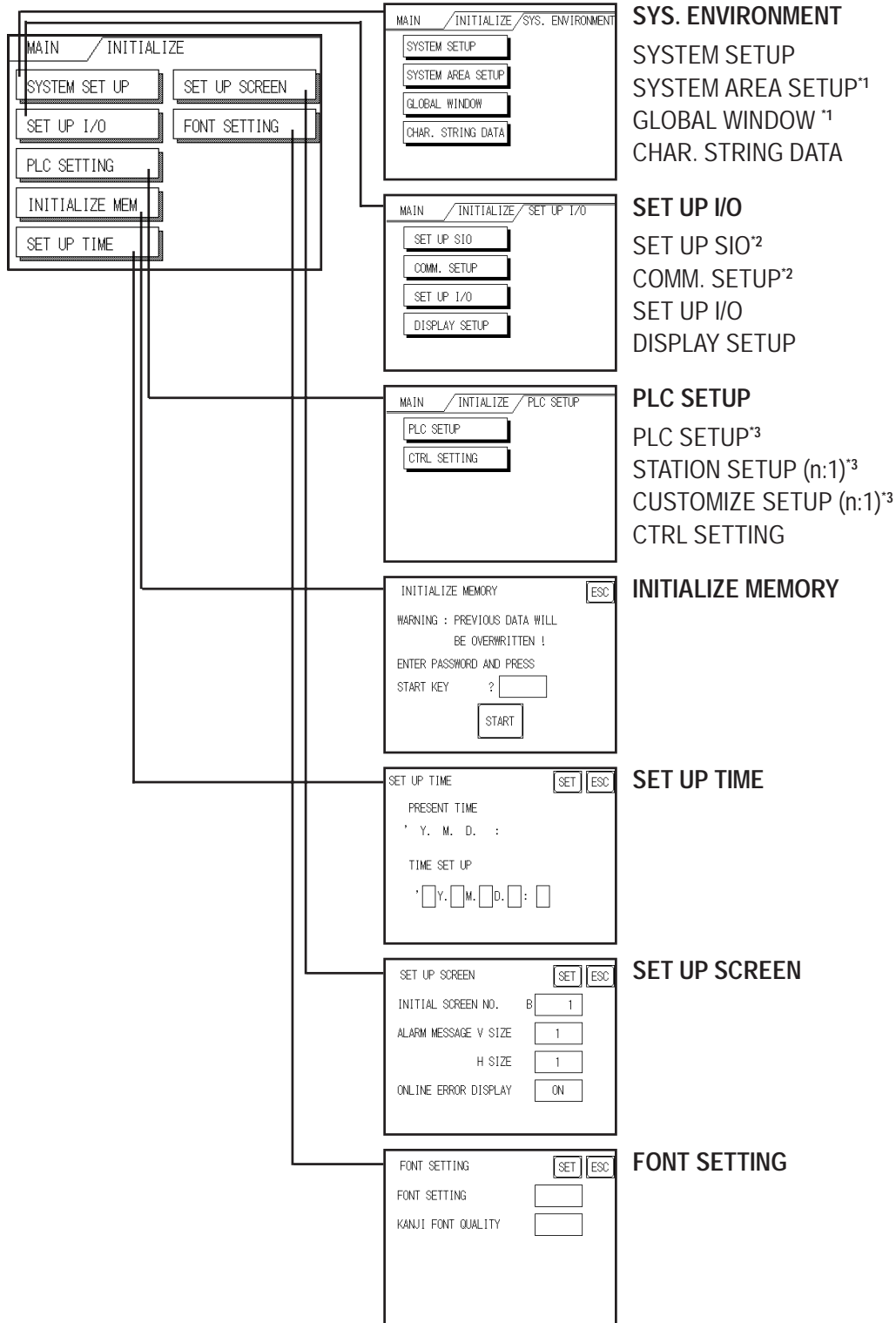
Reference For more information about LT System files, refer to the *LT Editor Operation Manual – Screen Creation Guide* (included with the LT Editor software) and the *GP-PRO/PBIII Operation Manual* (included with the C-Package software).

¹ The information contained in the LT Editor/C-Package's system file is set by the software's "System Setup".

6.2 Initialization Items

The contents of the Initialize menu's submenus (below) are explained in this Chapter.

Reference To learn about screen operations and numeric input, see Chapter 5 – “OFFLINE Mode.”



- 1 This feature is not available.
 - 2 Setup item invalid with, and not supported by, Type A1, Type A2, Type B, or Type B+.
 - 3 Setup item invalid with, and not supported by, Type A1, Type A2, Type B, or Type B+.
- Also the setting screen will vary depending on the [Device/PLC Type (Serial I/F)] selected via LT Editor/C-Package's [Project/New] menu.

6.3 SYSTEM ENVIRONMENT SETUP

LT environment adjustments are made within the setup screens contained in the SYSTEM ENVIRONMENT SETUP menu. Screens include the SYSTEM SETUP and CHARACTER STRING DATA SETUP.



Note: The SYSTEM AREA SETUP and GLOBAL WINDOW SETUP features are not available.

6.3.1 SYSTEM SETUP

SYSTEM SET UP		SET	ESC
STANDBY MODE TIME[MIN]	<input type="text" value="0"/>		
START TIME[SEC]	<input type="text" value="0"/>		
TOUCH BUZZER SOUND	<input type="text" value="ON"/>		
PASSWORD SET UP	<input type="text" value="0"/>		
DATA TYPE OF SCREEN NO	<input type="text" value="BIN"/>		

STAND-BY MODE TIME (0–255)

To protect the LT unit's display screen, a screen saver function automatically turns the unit's backlight(s) OFF when no operations have occurred within a specified period of time. No screen saver will be used when "0" is entered in this field.

When the SYSTEM DATA AREA's SCREEN DISPLAY OFF*¹ data is set to **0000h**, the LT unit's current display data will clear if the following operations are not performed within the user's specified period of time:

- Change Screen
- Touch Screen
- Alarm Display

START TIME (0–255)

Use this setting item to specify the LT unit's startup time — or to adjust the powering-up sequence — so that the LT starts up *after* the external devices start.

TOUCH BUZZER SOUND

Use this feature to indicate with a buzzing sound that the LT has been touched.

PASSWORD SETUP

The password setting item is used when the LT switches to the Initialize Memory or Initialize (OFFLINE mode) screens. The password — a number between **0** and **9999** — is a security feature within the OFFLINE mode, to protect the LT settings. If you do not wish to use this feature, enter the default value, "0."

¹ When using the Direct Access format, the object address becomes LS0009. When using the Memory Link format, the object address becomes +12. (Only when all items are set within the System Data Area.)

Reference *LT Editor Device Connection Manual* (included with the LT Editor software), *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software)

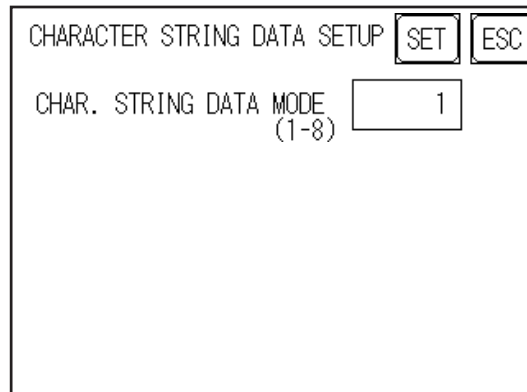
Chapter 6 – Initializing the LT

DATA TYPE OF SCREEN NO.

This setting specifies whether BIN or BCD format numbers are used when making screen changes.

6.3.2 CHARACTER STRING DATA SETUP

Character String Data ordering varies, depending on the manufacturer of the external device. Set up the Character String Data order to match that of the corresponding external device.



```
CHARACTER STRING DATA SETUP  SET  ESC
CHAR. STRING DATA MODE  1
(1-8)
```



Set the CHARACTER STRING DATA MODE to match that of the corresponding external devices. Only the external devices — and not their internal device addresses or Tag settings — are available for setup.

CHAR. STRING DATA MODE

Set up the CHARACTER STRING DATA MODE that corresponds to that of your external device, as specified in the following table.

- (I) Data Device Storage Order
- (II) Byte Storage Order (LH/HL), using single words
- (III) Word Storage Order (LH/HL), using double words

CHARACTER STRING DATA MODE (1–8) List

(I) Data Device Storage Order	(II) Byte Storage Order (LH/HL), using single words	(III) Word Storage Order (LH/HL), using double words	Character String Data Mode
Storage from Start Data	LH order	LH order	4
		HL order	2
	HL order	LH order	5
		HL order	1
Storage from End Data	LH order	LH order	6
		HL order	7
	HL order	LH order	8
		HL order	3

I. Data Device Storage Order

Example characters: A B C D E F G H
 └─┘ └─┘ └─┘ └─┘
 ① ② ③ ④

• **Storage from Start Data**

①	D100
②	D101
③	D102
④	D103

• **Storage from End Data**

④	D100
③	D101
②	D102
①	D103

II. Byte Storage Order (LH/HL), using Single Words

Example characters: A B C D
 ① ② ③ ④

• **16-bit Device LH Order**

②	①	D100
④	③	D101

• **16-bit Device HL Order**

①	②	D100
③	④	D101

• **32-bit Device LH Order**

②	①	④	③	D100
---	---	---	---	------

• **32-bit Device HL Order**

①	②	③	④	D100
---	---	---	---	------

III. Word Storage Order (LH/HL), using Double Words

Example characters: A B C D E F G H I J
 └─┘ └─┘ └─┘ └─┘ └─┘
 ① ② ③ ④ ⑤

• **16-bit Device LH Order**

②	D100
①	D101
④	D102
③	D103
⑤	D104

• **16-bit Device HL Order**

①	D100
②	D101
③	D102
④	D103
⑤	D104

Example characters: A B C D E F G H I J K L M N O P Q R S T
 └─┘ └─┘ └─┘ └─┘ └─┘ └─┘ └─┘ └─┘ └─┘ └─┘
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

• **32-bit Device LH Order**

②	①	D100
④	③	D101
⑥	⑤	D102
⑧	⑦	D103
⑩	⑨	D104

• **32-bit Device HL Order**

①	②	D100
③	④	D101
⑤	⑥	D102
⑦	⑧	D103
⑨	⑩	D104

Chapter 6 – Initializing the LT

Relationship between the internal device address and external devices, when using the Write Character Value operation.

◆ 16-bit Devices

The LT stores the character string in one internal Device, in groups of two, starting with the first pair of characters.

When nine characters make up a string, they are arranged as follows:

1 2 3 4 5 6 7 8 9 Null
└─┘ └─┘ └─┘ └─┘ └─┘



When the characters do not divide evenly by two, NULL is added to the last character to make up the final pair and complete the string.

◆ 32-bit Devices

The LT stores the character string in one internal device address, in groups of four, starting with the first group of characters.

When there are nine characters, they are arranged as follows:

1 2 3 4 5 6 7 8 9 Null
└─┘ └─┘ └─┘



When the characters do not divide evenly by four, NULL is added to the last character to make up the final group and complete the string.

6.4 SET UP I/O

This section describes the communication setup and the configuration for any peripheral equipment. The SET UP I/O menu includes the SET UP SIO, COMMUNICATION SETUP, SET UP TOUCH PANEL, and DISPLAY SETUP screens.



Note:

The SET UP SIO and COMMUNICATION SETUP setting items are invalid with and are not supported by Type A1, Type A2, Type B, or Type B+ units.

6.4.1 SET UP SIO

This screen controls the settings related to communication with the external devices. The settings will vary, depending on the external device.

Be sure to match the LT unit's SIO settings (below) with the SIO settings of the external device.

Reference *LT Editor Device Connection Manual* (included with the LT Editor software), *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software)



Note:

The following settings are not available with Type A1, Type A2, Type B, or Type B+ units.

SET UP SIO	SET	ESC
COMMUNICATION RATE	19200	
DATA LENGTH	7/2	
PARITY	EVEN	
CONTROL	ER-CNTRL	
COMMUNICATION INTERFACE	RS232C	

COMMUNICATION RATE

The COMMUNICATION RATE (baud rate) is the data communication speed, measured in bits per second (bps), between the LT and the external devices. Depending on the rate selected, you may not be able to use certain external devices.

Reference *LT Editor Device Connection Manual* (included with the LT Editor software), *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software)

DATA LENGTH / STOP BIT

For data communication, use the following settings:

- DATA LENGTH: 7 or 8 bits
- STOP BIT: 1 or 2 bits

PARITY

Use this setting to specify whether an ODD or EVEN number parity check, or NONE at all, will take place during communication.

Chapter 6 – Initializing the LT

CONTROL

The Data Flow CONTROL setting prevents the overflow of data transmitted and received. Select either X-CNTRL or ER-CONTRL.

COMMUNICATION FORMAT

Use the RS-232C, the RS-422 (4-line), or the RS-422 (2-line) for the Communication Format setting.



Note: When using an RS-422 cable and the Memory Link format, be sure to select the 4-line option.



Reference *LT Editor Device Connection Manual* (included with the LT Editor software), *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software)

6.4.2 COMMUNICATION SETUP

This section explains how to use the Retry command to deal with errors, including those that occur during communication between the LT and external devices.



Note: This setting is disabled on the Type A1, Type A2, Type B and Type B+ units

COMMUNICATION SETUP	SET	ESC
RECEIVE TIMEOUT (1-127)	10	SEC
RETRY COUNT (0-255)	2	

RECEIVE TIMEOUT

Use a numeric value to set a period of time in which the LT can receive data from the external device. When the cable is not connected, data communication will Timeout after one second, regardless of this setting's value.

The default value for the RECEIVE TIMEOUT setting is 10 seconds.



Note: When the RECEIVE TIMEOUT value is set to 30 seconds or more and the occurrence of an external communication error has not yet cleared, transferring screen data files may result in an error message appearing on your PC.

RETRY COUNT

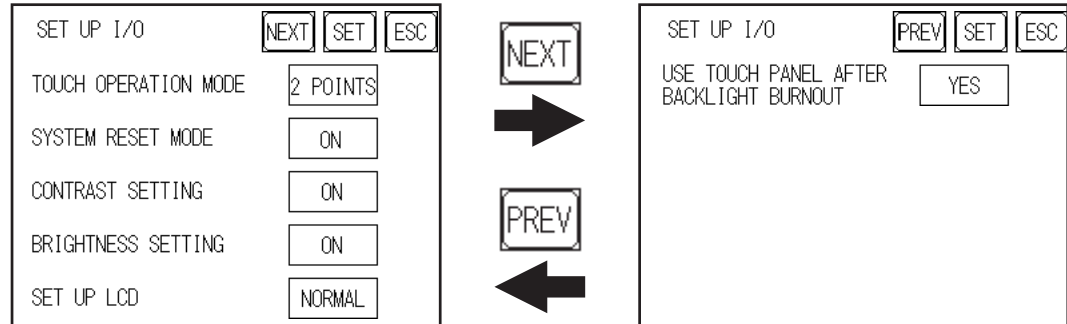
Use this setting item to designate the number of times the LT tries to send data to the external device when an external communication error occurs. After the LT unit's specified number of attempts has failed to send data to the external device, an error message will appear on the LT.

The default value for the Retry Count setting is "2."

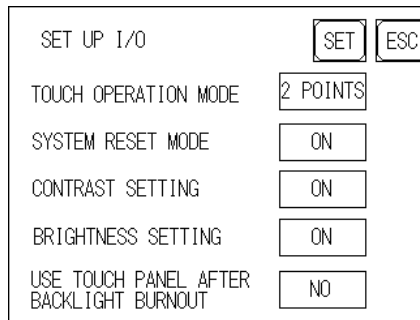
6.4.3 SET UP TOUCH PANEL

This screen is where you can set up the touch panel's Touch Operation and System Reset modes, and adjust the Display settings.

◆ When using a monochrome model:



◆ When using a color model:



TOUCH OPERATION MODE

Designates either One Point, Two Points, or No Slide.

1 Point Touch	Designates that the touch panel accepts only 1 point touch input. As soon as touch screen contact is released, touch input is cancelled.
2 Point Touch	Designates that the touch panel accepts up to 2 points of touch input. If 3 or more points are touched simultaneously, input is not accepted and touch input is not cancelled. In a single switch, up to 2 points can be touched.
No Slide	Designates that the touch panel accepts only 1 point touch input. If 2 or more points are touched simultaneously, input is not accepted and touch input is not cancelled. Input is cancelled if the touch is moved (slides) outside the current "active" area.

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SYSTEM RESET MODE

This setting allows the user to enable or disable the System Reset menu bar. When set to YES, the menu bar will display.

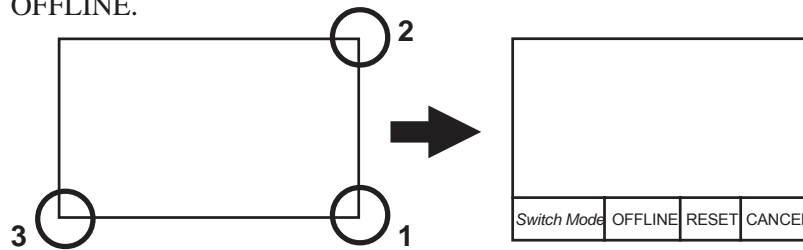


You can perform **SYSTEM RESET** regardless of whether the LT unit is operating in **RUN** mode or in **OFFLINE** mode.

◆ To Display the Menu Bar

To enter the SYSTEM RESET mode, press the bottom-right corner of the screen (position 1, below), and then touch the top-right and bottom-left corners (positions 2 and 3).

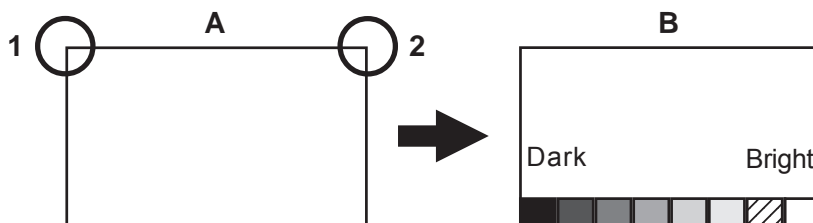
To activate Reset, touch the **RESET** button; to change to **OFFLINE** Mode, touch **OFFLINE**.



- The menu bar will not display while the LT is starting up.
- Entering SYSTEM RESET is possible even when the external device and the LT are communicating.

CONTRAST SETTING

When **CONTRAST SETTING** is set to **ON**, you can adjust the contrast by touching the LT unit's screen. To adjust the Contrast mode, press the screen's top-left corner (screen A, position 1, below), and then touch the top-right corner (position 2). When the contrast adjustment screen (B) appears, touch to select the desired level of brightness, and the screen's contrast will adjust according to your changes.





- To exit the CONTRAST SETTING mode, touch anywhere above the Contrast Setting bar.
- You cannot enter the CONTRAST SETTING mode while waiting for LT to start up.
- CONTRAST SETTING adjustments (LT and external devices) can be made during RUN mode.

BRIGHTNESS SETTING

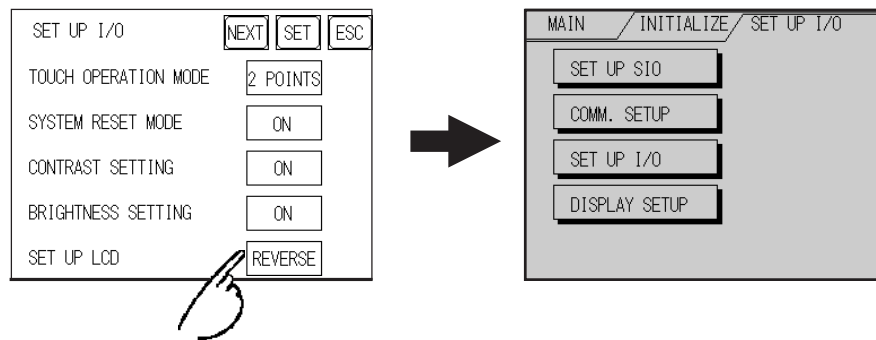
The brightness control function is unavailable and the setting is invalid in the LT unit.

SET UP LCD

This setting reverses the colors of the LT unit's display screen and characters.

To reverse the screen's display, touch SET UP LCD on the SET UP I/O screen to change the setting from NORMAL to REVERSE, and then touch the SET key.

The display color reverses and the SET UP I/O menu reappears.



USE TOUCH PANEL AFTER BACKLIGHT BURNOUT

Access this setup screen by touching [NEXT]. This setting allows the user to enable [YES] or disable [NO] the touch operation when the backlight burns out. Setting this item to [NO] prevents the LT from sending input signals to the external devices.



When the Backlight Burns Out:

- The Status LED's orange light will turn ON.
- The System Data Area's Status bit 10*1 will turn ON.
- If the SYSTEM RESET item is set to ON, only SYSTEM RESET can still be performed by touch operation.
- If the LT is in OFFLINE mode, the touch-panel operation will become enabled, regardless of the settings.



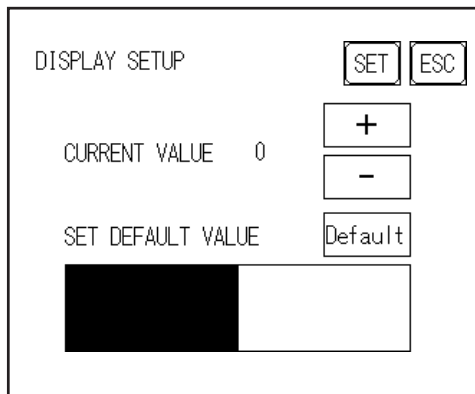
Normally, the unit detects backlight burnout by monitoring the current; however, depending on the problem with the backlight, the unit may fail to detect this condition.

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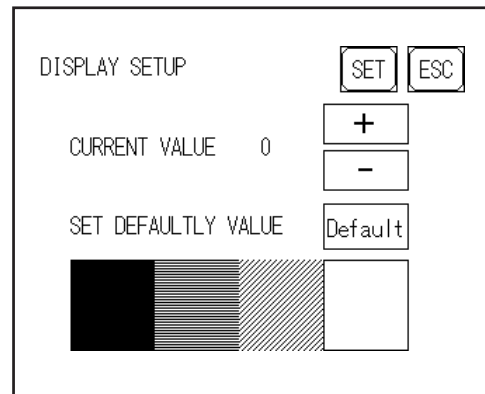
6.4.4 DISPLAY SETUP

The LT unit's screen may flicker, or the LCD's surface may appear to have shadows on extended display lines. This effect may be more pronounced when the LT unit's ambient temperature is high, and its current level of brightness is set to low. This phenomenon, however, is a common attribute of LCDs and is not a defect. To solve this problem, use the Display Setup screen to adjust the LT unit's brightness.

When using a monochrome model:



When using a color model:



CURRENT VALUE

Touch [+] or [-] to adjust the levels of brightness (18 levels of [+] and two levels of [-] brightness). You can check the brightness level in the preview field at the bottom of the screen. The default value of brightness is “0.”

SET DEFAULT VALUE

If you touch Default, the setting returns to “0.”

1 When using the Direct Access format, the object address becomes Bit +6. When using the Memory Link format, the object address becomes +11. (Only when all items are set within the System Data Area.)

Reference *LT Editor Device Connection Manual (included with the LT Editor software), GP-PRO/PBIII Device/PLC Connection Manual (included with the C-Package software)*

6.5 OPERATION ENVIRONMENT SETUP

Set up the external device's System Area and the Unit Number in this screen. This section pertains to external devices that use the Direct Access format.



Note: When the LT Editor/C-Package's Simulation feature is used, the OPERATION SURROUNDINGS menu cannot be used.

6.5.1 SET UP OPERATION ENVIRONMENT

Use this setup screen to enter the external device's System Data Area and the Unit Number settings.



- Type A1, Type A2, Type B and Type B+ do not have this setting.
- The screens that appear depend on the external device that you selected in the LT Editor/C-Package.

Reference *LT Editor Device Connection Manual* (included with the LT Editor software), *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software)

SET UP OPERATION SURROUNDINGS		SET	ESC
SYSTEM AREA START DEV	<input type="text"/>		
START ADR	<input type="text"/>		
UNIT No.	<input type="text"/>		
SYSTEM AREA READ SIZE	<input type="text"/>		
RESET GP ON WRITE ERROR	<input type="text"/>		

SYSTEM AREA START (DEV / ADR)

Use this item to set up the System Data Area's Start Address. User-specified Device Addresses will differ, depending on the type of external device used.

Reference *LT Editor Device Connection Manual* (included with the LT Editor software), *GP-PRO/PBIII Device/PLC Connection Manual* (included with the C-Package software)

UNIT NO.

Enter the UNIT number of the external device. Be sure that it matches the unit number of the external device.

SYSTEM AREA READ SIZE

When using a Block Display Trend Graph, set up the Reading Area Size (in word units) to match the Trend Graph's data size.



Note: If you are not using the Reading Area, leave the default values that are set to "0" intact, to allow high-speed data communication.

Chapter 6 – Initializing the LT

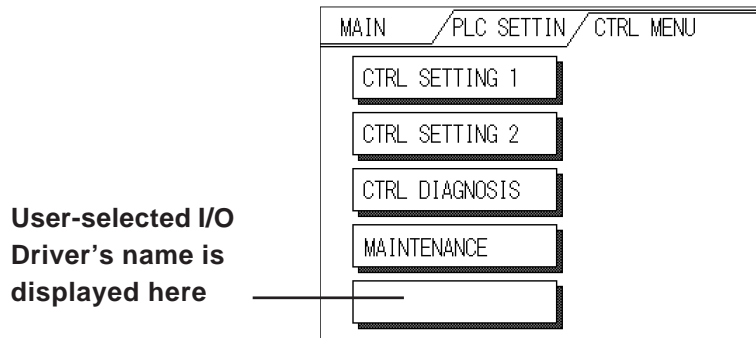
RESET LT ON DATA WRITE ERROR

This setting item allows you to reset the LT, from the error display, when the Write error occurs.

6.5.2 CONTROLLER SETTINGS

This section describes the Controller setting items. The CTRL MENU includes the CTRL SETTING, CTRL DIAGNOSIS, and I/O DRIVER setup screens.

For a description of the CTRL DIAGNOSIS and I/O DRIVER setting items, see the references cited at the end of this section.



■ CTRL SETTING

Information set via LT Logic Program Editor/C-Package or Controller Settings is stored in the LT unit's nonvolatile memory. Although each item in the Controller Settings screen has a default setting, each should be set to match your application.

Controller Setting 1

CONTROLLER SETTING 1		DEF.	SET	ESC
TARGET SCAN TIME (10-2000ms)	<input type="text"/>			ms
PERCENT ALLOCATION (0-50%)	<input type="text"/>			%
CONTROLLER STATE	<input type="text"/>			
STOP ON MINOR FAULT	<input type="text"/>			
WATCHDOG TIMER (100-3000ms)	<input type="text"/>			ms

Controller Setting 2

CONTROLLER SETTING 2		DEF.	SET	ESC
ENABLE I/O	<input type="text"/>			
CHANGE SCREEN CHECK	<input type="text"/>			

CONTROLLER SETTING 1

TARGET SCAN TIME

Use Target Scan Time to set the time periods for the Controller and the Display operation time functions. The setting range for Target Scan Time is between 10 and 2000 ms.

The Controller Operation Time function sets the time it takes to execute the I/O reading, Logic Program, and I/O writing. When Target Scan is set, the maximum time allocated to the Controller Operation Time function is 50%.

▼ **Reference** ▼ *LT Editor Operation Manual – Logic Programming Guide* (included with the LT Editor software), *Pro-Control Editor User Manual* (included with the C-Package software)

PERCENT ALLOCATION

Use Percent Allocation to set the ratio of Controller Operation Time Function in Target Scan Time. The setting range for Percent Allocation is between 0 and 50%. When Percent Allocation is set, Target Scan is disabled.

▼ **Reference** ▲ *LT Editor Operation Manual – Logic Programming Guide (included with the LT Editor software), Pro-Control Editor User Manual (included with the C-Package software)*

CONTROLLER STATE

This item sets the Operation Mode — Default, Run, or Stop — when the power is ON.

The Controller State setting is valid only when the RUN/STOP switch on the back of LT is set to Run. When the switch is set to Stop, the Operation Mode will always be Stop, regardless of this setting's value.

STOP ON MINOR FAULT

This item either stops the Controller or executes a logic program when a minor fault occurs. If you wish operation to continue after a fault occurs, set this switch to Continue; if you wish to stop operation, set it to Stop.

▼ **Reference** ▲ *LT Editor Online Help, Pro-Control Editor Online Help*

WATCHDOG TIMER

Sets the Watch Dog Timer (WDT) for the Controller Operation Time and the LT Operation Time functions to between 100 and 3000 ms. Input the value in units of 100 ms. Inputting “0” is invalid.

CONTROLLER SETTING 2

CHANGE SCREEN CHECK

After #Screen is used to perform the screen change, the #Screen setting value is reset to “0”. Using the ON (initial) setting will clear the #Screen value to “0”.

▼ **Reference** ▲ *LT Editor Operation Manual – Logic Programming Guide (included with the LT Editor), Pro-Control Editor User Manual (included with the C-Package software)*

■ CTRL DIAGNOSIS

▼ **Reference** ▲ *Section 7.3.3 – “List of Controller Self-Diagnostics Items”*

■ I/O DRIVER

The supported driver type depends on the LT type. Types A1 and A2 support the DIO driver, and types B, B+ and C support the Flex Network Driver. The logic program that configures each I/O driver will be downloaded.

▼ **Reference** ▲ *LT Editor Operation Manual – Logic Programming Guide (included with the LT Editor), Pro-Control Editor Operation Manual (included with the C-Package software)*

6.6 INITIALIZE INTERNAL MEMORY

This setup screen initializes all LT screen data (internal memory) and Back Up SRAM. Initialization does not erase the SYSTEM SET UP, SIO protocol, internal clock settings, logic programs, or the retentive variables.



You cannot cancel the Initialization procedure after pressing [START].

```
INITIALIZE MEMORY [ESC]
WARNING : PREVIOUS DATA WILL
          BE OVERWRITTEN !
ENTER PASSWORD AND PRESS
START KEY ? [input box]
[START]
```

To initialize the LT unit's internal memory, enter the default password, "1101," or the password entered in the SYSTEM SET UP screen.

Reference Chapter 5.3 – "INITIALIZATION"



The time required for Initialization is between 10 and 20 seconds.

6.7 SET UP TIME

Set the LT unit's internal clock in the Set Up Time screen. Adjust the Date and Time display settings in the PRESENT TIME setting item.



The screen displays the Hour and Minute settings, but not the Seconds.

```
SET UP TIME [SET] [ESC]
PRESENT TIME
' Y. M. D. :
TIME SET UP
' [input box] Y. [input box] M. [input box] D. [input box] : [input box]
```

The LT unit's internal clock has a slight error. At normal operating temperatures and conditions, with the LT operating from its lithium battery, the degree of error is ± 65 seconds per month. Variations in operating conditions and battery life can cause this error to vary from -380 to +90 seconds per month. For systems where this degree of error will be a problem, the user should monitor this error and make adjustments as necessary.

6.8 SET UP SCREEN

Use this screen to enter the number of the screen that is initially displayed after startup, the character size when the LT is in RUN mode, and other general screen items.

SET UP SCREEN		SET	ESC
INITIAL SCREEN NO.	B	1	
ALARM MESSAGE V SIZE		1	
H SIZE		1	
ONLINE ERROR DISPLAY		ON	

INITIAL SCREEN NO.

This setting item specifies the file number of the screen that initially displays on startup.

If the BIN option was selected for DATA TYPE OF SCREEN NO in the SYSTEM SET UP screen, enter a number from B1 to B8999; if BCD was the setup option, enter a number from B1 to B1999.

ALARM MESSAGE

Use this setting item to set the character size for the ALARM MESSAGE, when activated by the Alarm Bulletin.

1

2

4

When using single-byte characters:

V size=1
H size=1
16×8 pixels

V size=2
H size=2
32×16 pixels

V size=4
H size=4
64×32 pixels

When using double-byte characters:

V size=1
H size=1
16×16 pixels

V size=2
H size=2
32×32 pixels

V size=4
H size=4
64×64 pixels

ONLINE ERROR DISPLAY

Use this item to set up whether or not error messages display during RUN mode.

6.9 FONT SETTING

Use this screen to set the font that is displayed by the LT.

FONT SETTING	SET	ESC
FONT SETTING	JAPAN	
KANJI FONT QUALITY	HIGH	

FONT SETTING

Select the font type that is displayed on the LT unit's screen during operation.

KANJI FONT QUALITY

Designates the font display quality for enlarged characters.

Differences in FONT SETTINGS:

◆ When FONT SETTING is set to [JAPAN]

Single-byte characters will remain 8x16-dot characters when enlarged.

Double-byte characters are displayed as:

Standard Characters are displayed using 16x16-dot "blocks." When enlarged, this font will remain a 16x16-dot character.

HIGH When enlarged to double size, Level 1 JIS Kanji Code characters display as 32x32-dot characters. Level 2 JIS Kanji Code characters will remain 16x16-dot characters.

HIGH (1, 2) When enlarged to double size, both Level 1 and Level 2 JIS Kanji Code characters display as 32x32-dot characters.

◆ When FONT SETTING is set to any other type, such as [CHINA], [I-ASCII], [KOREA], or [TAIWAN]

Standard Half-size (single-byte) characters display as 16x8-dot characters. Full-size characters, regardless of the display size used, always display as 16x16-dot characters. When enlarged, this font will remain a 16x16-dot character.

HIGH (1) All half-size (single-byte) characters — ASCII code: 21h to 7Dh, or alphanumeric characters (except the “ ^ ” and “ ‘ ” characters) — display as high quality characters.

- 16x16-dot characters or larger display as high quality 16x16 fonts.
- 32x32-dot characters or larger display as high quality 32x32 fonts.

Full-sized (double-byte) characters display as 16x16-dot characters, and remain 16x16-dot characters when enlarged.

HIGH (1, 2) All single-byte characters — ASCII code: 21h to 7Dh, or alphanumeric characters (except the “ ^ ” and “ ‘ ” characters) — display as high quality characters.

- When 16x16 dots are used, the characters display as high quality 16x16-dot characters.
- When 32x32 or larger-sized dots are used, the characters display as high quality 32x32-dot characters.

Full-sized (double-byte) characters — [KOREA], [TAIWAN], and [CHINA] — display as 32x32-dot characters when enlarged to 32x32-dot characters or larger.

Memo

Chapter

7 RUN Mode and Errors

1. RUN Mode
2. Troubleshooting
3. Self-Diagnosis
4. Error Messages

7.1 RUN Mode

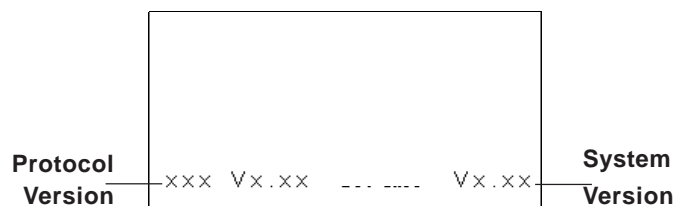
The LT unit enters the RUN mode in two instances: either immediately after plugging in the unit's power cord, or from the LT unit's OFFLINE mode.

7.1.1 After Connecting the Power Cord

The method of LT startup depends on which "START TIME" setting is specified in the Initialization Settings | System Setup screen.

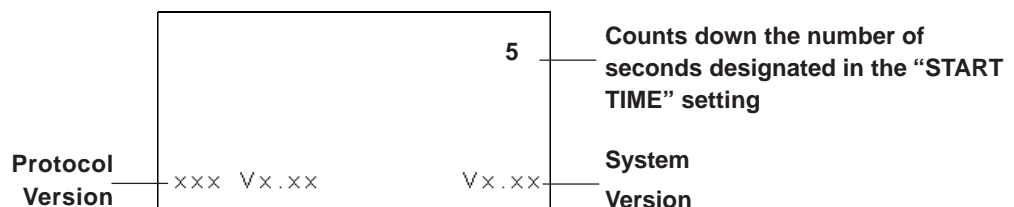
■ When START TIME is set to "0"

When the LT unit's power cord is connected, the version information screen appears (see below). The screen designated by the initialization screen file number (within the Initialization Settings | System Setup screen) appears, and the LT starts to communicate with the external device.



■ When START TIME is set to any value other than "0"

When the LT unit's power cord is connected, a value appears in the version information screen (below), which counts down the seconds designated by the "START TIME" setting. The screen designated by the initialization screen file number (within the Initialization Settings | System Setup screen) appears, and the LT starts to communicate with the external device.



If the initialization screen's file number is not designated, or if a number is designated that does not exist, the version information screen remains displayed.



Note: Depending on the display device's startup time, it is possible that the screens shown above may not be initially displayed.

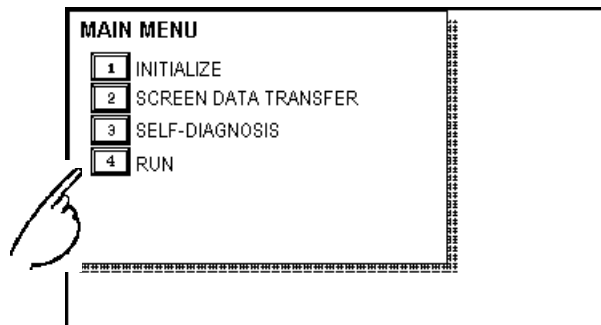
Chapter 7 – RUN Mode and Errors

7.1.2 Via OFFLINE Mode

Touch the MAIN MENU's RUN option to start your downloaded project.

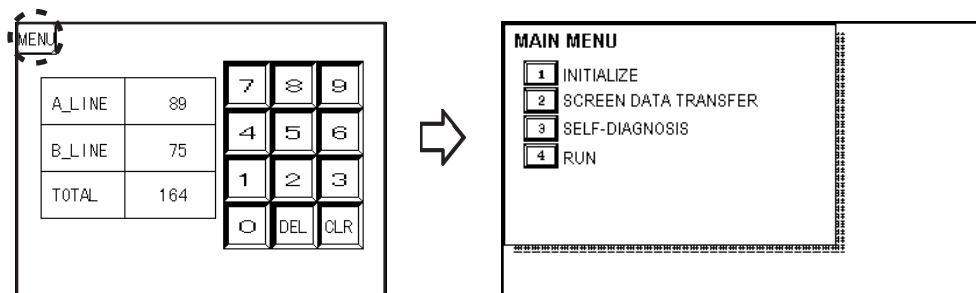
The INITIALIZE menu's SET UP screen designates the screen that initially appears in RUN mode. After this first screen appears, communication with the external device begins.

However, if the initial screen has not been created, or does not exist, the version information screen (see previous page) remains displayed.



To enter OFFLINE Mode, touch the top left corner of the LT unit's screen within 10 seconds after connecting the LT unit's power cord.

After powering up the LT, the initial screen appears. This screen is equipped with a built-in (invisible) switch in the top left corner that, if touched within 10 seconds, can change the LT from RUN to OFFLINE mode.



7.2 Troubleshooting

This section describes how to find and resolve problems that may occur with the LT. If there is a problem with the external device, refer to the external device's corresponding manual.

7.2.1 Possible Problems

The following items are problems that may occur while using this unit.

(A) No Display (See Section 7.2.2)

The screen will not display even when the LT unit is powered on. Also, during RUN mode, the screen disappears.

(B) No LT/HOST Communication (See Section 7.2.3)

The LT unit cannot extract data from the host. An error message may appear on the screen as a result.

▼Reference▲ Section 7.4 – “Error Messages”

(C) Touch Panel Does Not Respond (See Section 7.2.4)

The touch panel does not react when touched, or the reaction time is very slow.

(D) Logic Program Does Not Run (See Section 7.2.5)

The LT freezes, or the control memory's retentive area does not work.

(E) Clock Settings Cannot be Entered (See Section 7.2.6)

Even after clock settings are entered, the LT unit's clock settings remain eg.00/01/01.

▼Reference▲ For problems A to E, see the corresponding flowcharts on Troubleshooting in Sections 7.2.2 to 7.2.6.

(F) OFFLINE Displays During RUN Mode

The LT unexpectedly goes to the OFFLINE mode while operating, or the LT automatically goes to the OFFLINE mode when the power is turned ON. In this case, a SYSTEM ERROR may have developed while displaying the OFFLINE Mode screen.

▼Reference▲ Section 7.4.2 – “Error Messages Details”

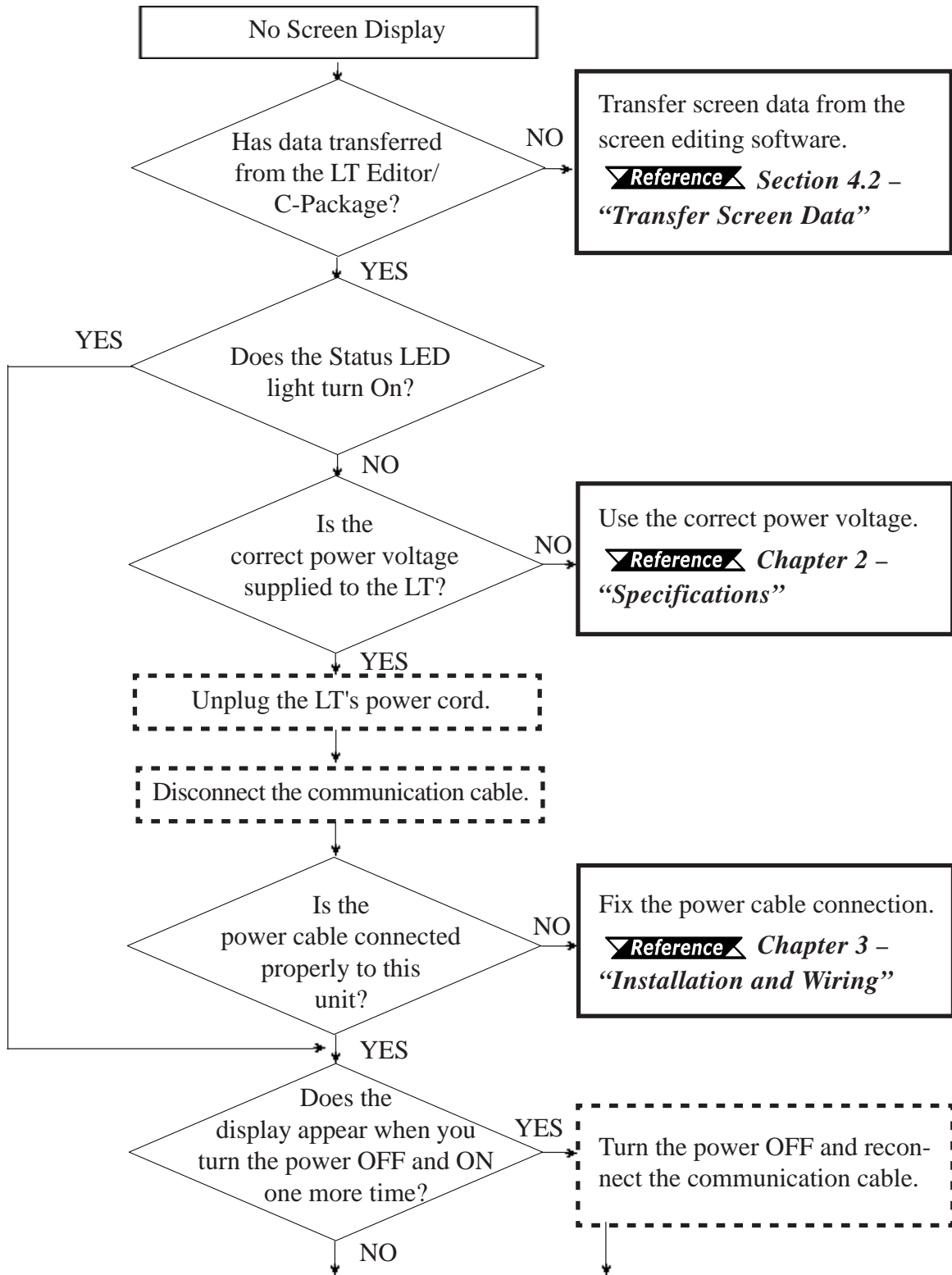
If the LT goes to the OFFLINE mode without displaying an error message when the power is turned ON, be sure that no object has touched the screen accidentally. Any object that touches the top-left corner of the screen within 10 seconds after the power turns ON may cause the LT to go OFFLINE.

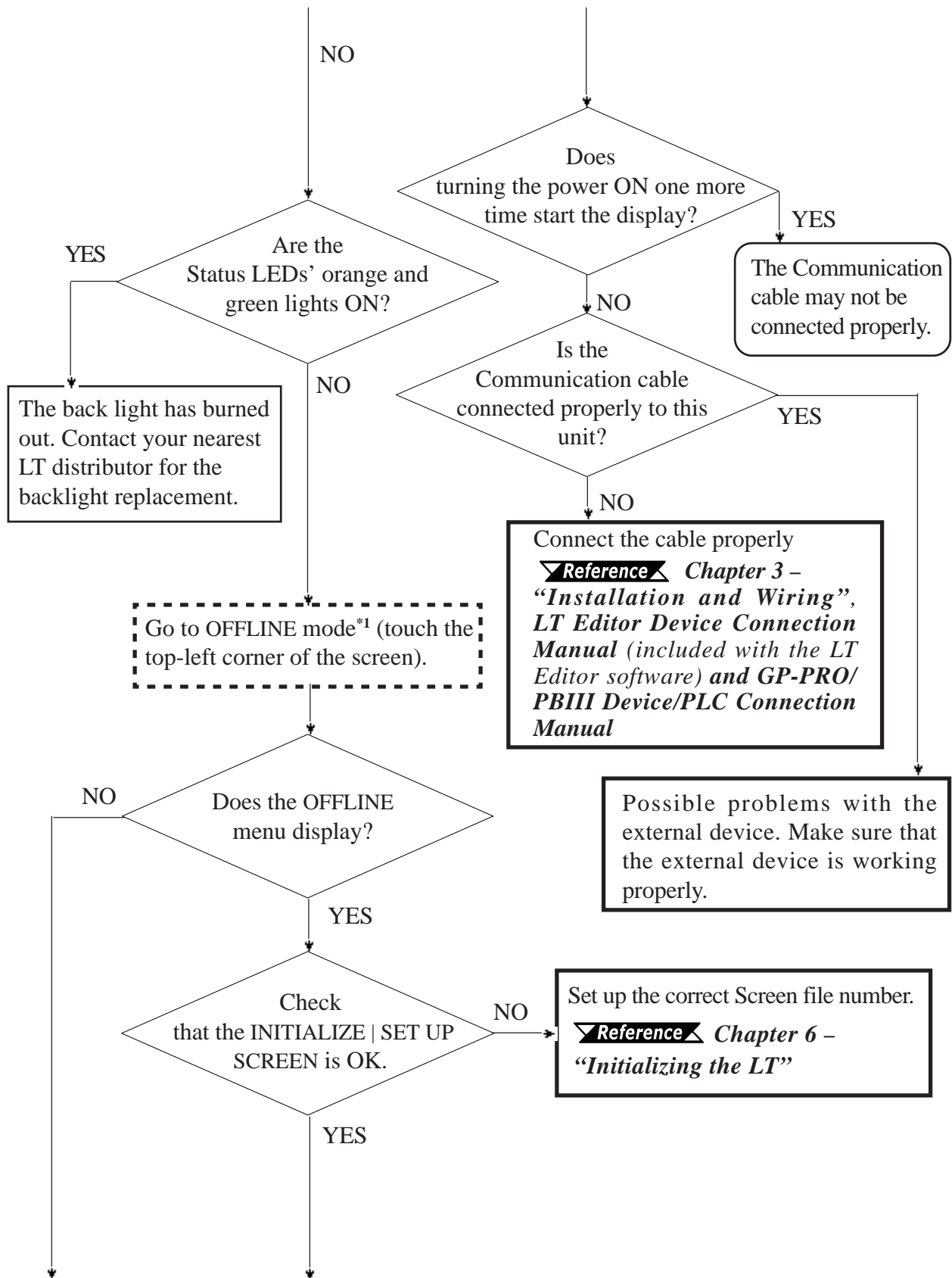
▼Reference▲ For other types of Flex Network problems, refer to the *Flex Network User Manual*.

Chapter 7 – RUN Mode and Errors

7.2.2 No Display

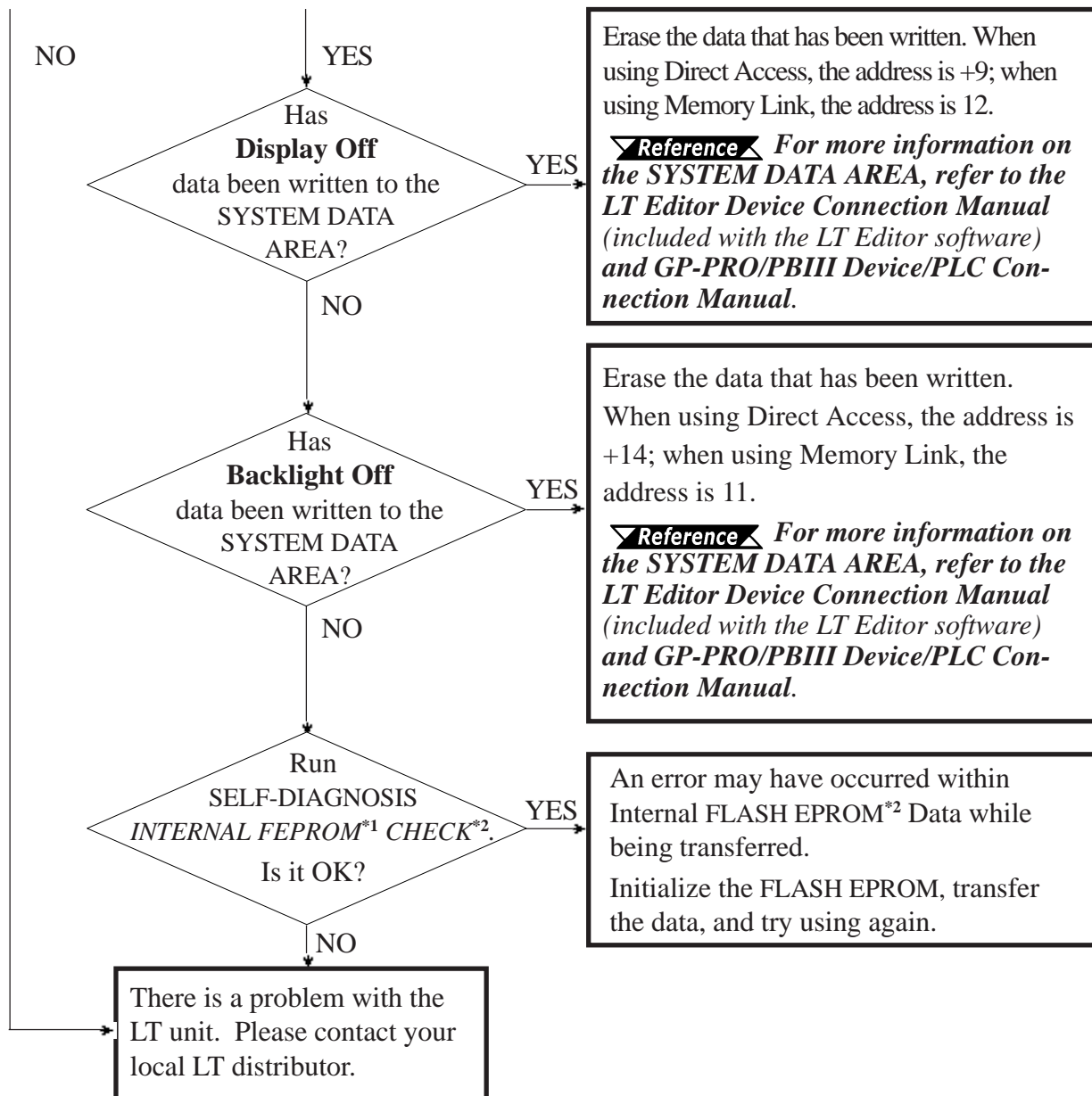
When the screen does not display when powering up, or the screen turns OFF by itself during RUN mode, use the following flowchart to find an appropriate solution.





1 To make the OFFLINE screen appear, turn the power OFF, then ON, and then touch the upper left corner of the screen within 10 seconds.

Chapter 7 – RUN Mode and Errors



¹ Also known as “FEEPROM” (Flash Electronic Erasable Programmable Read Only Memory).

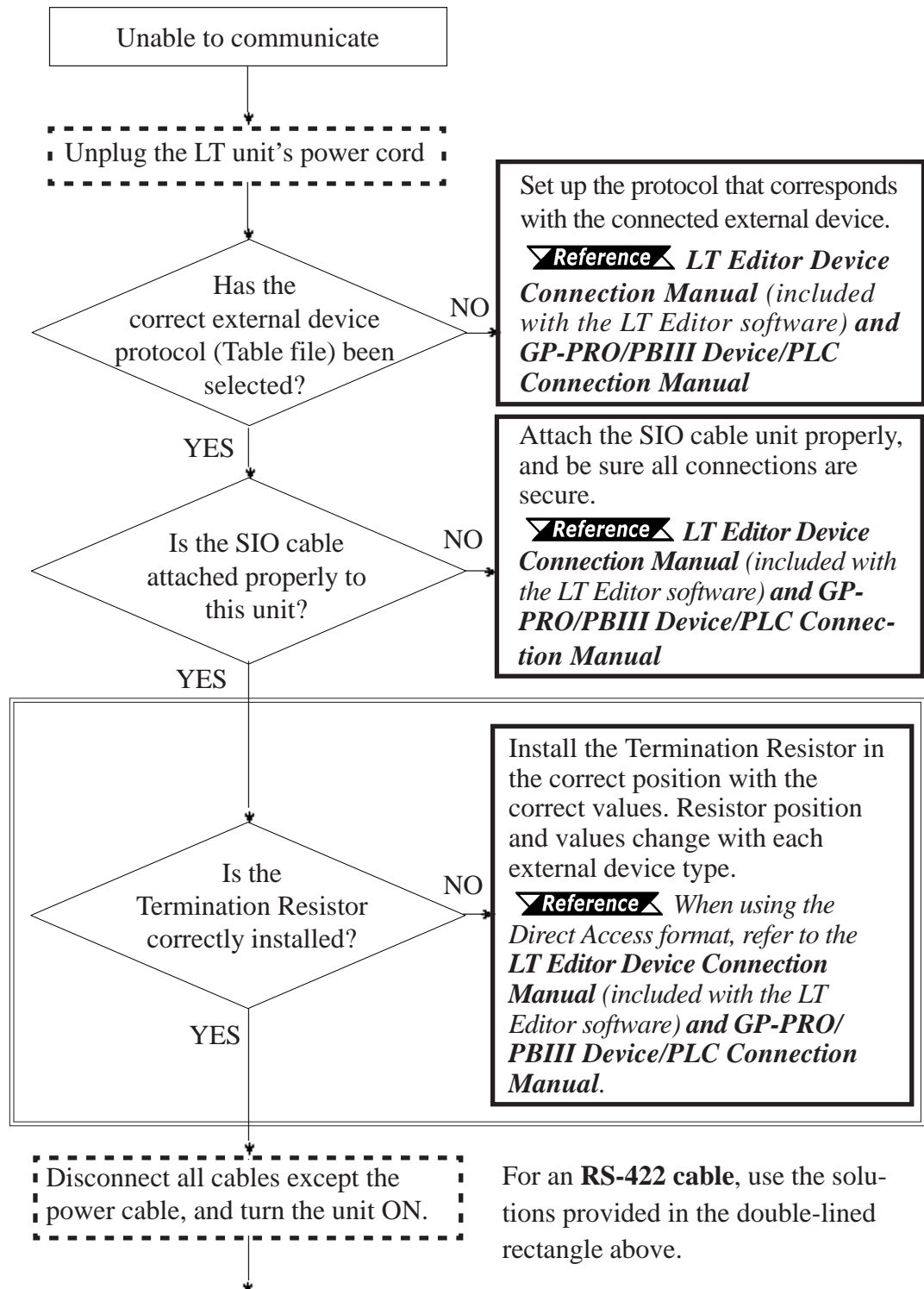
² When you run the SELF-DIAGNOSIS area’s FLASH EPROM CHECK, all screen data is erased. Therefore, be sure to make a backup of all LT screens prior to performing this check.

7.2.3 No LT / Host Communication

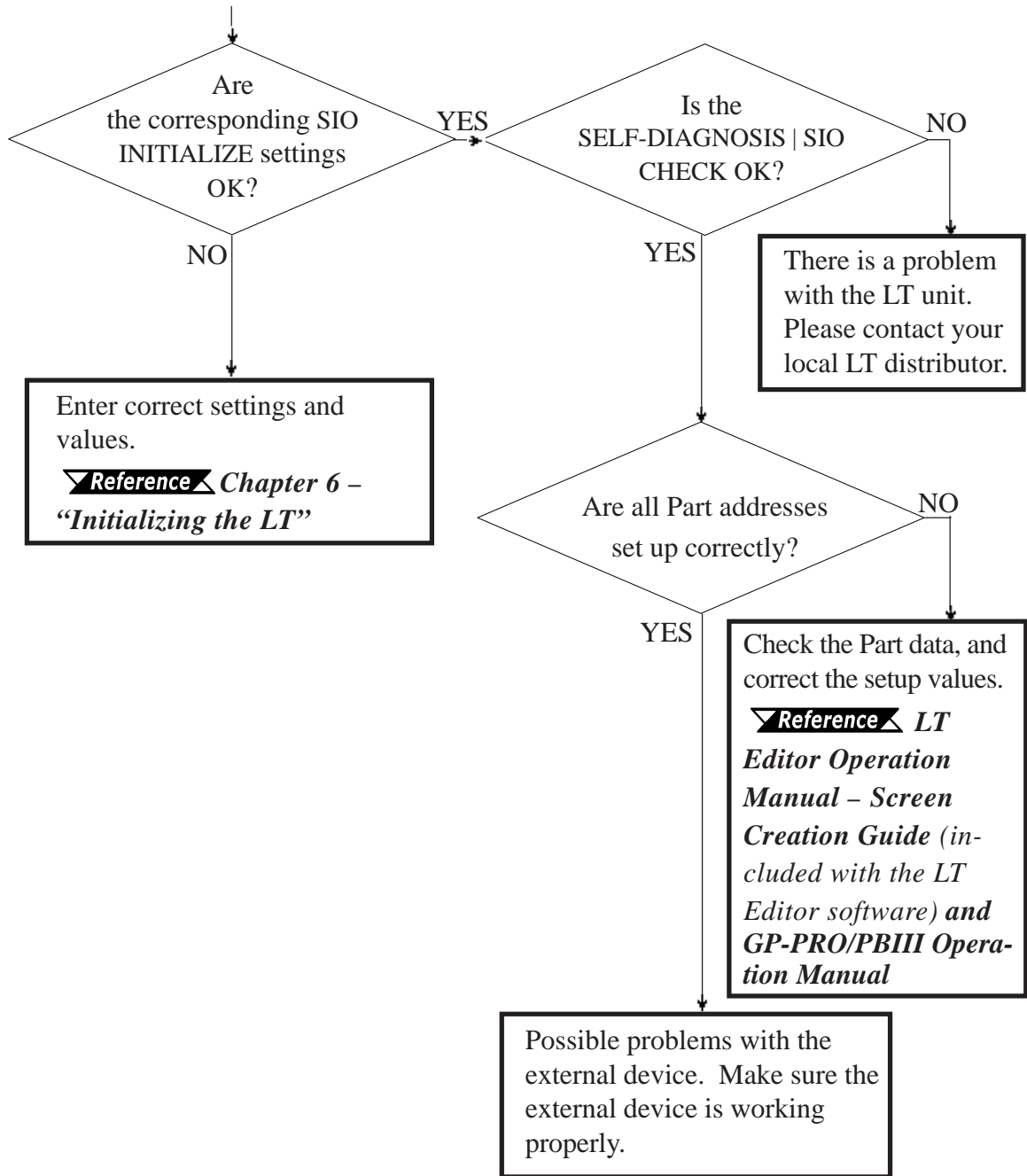
When the LT will not communicate with the host external device, use the following flowchart to find both the cause of the problem and a suitable response.

If an error message displays on the screen, check the error code to find the appropriate solution.

Reference Section 7.4 – “Error Messages”

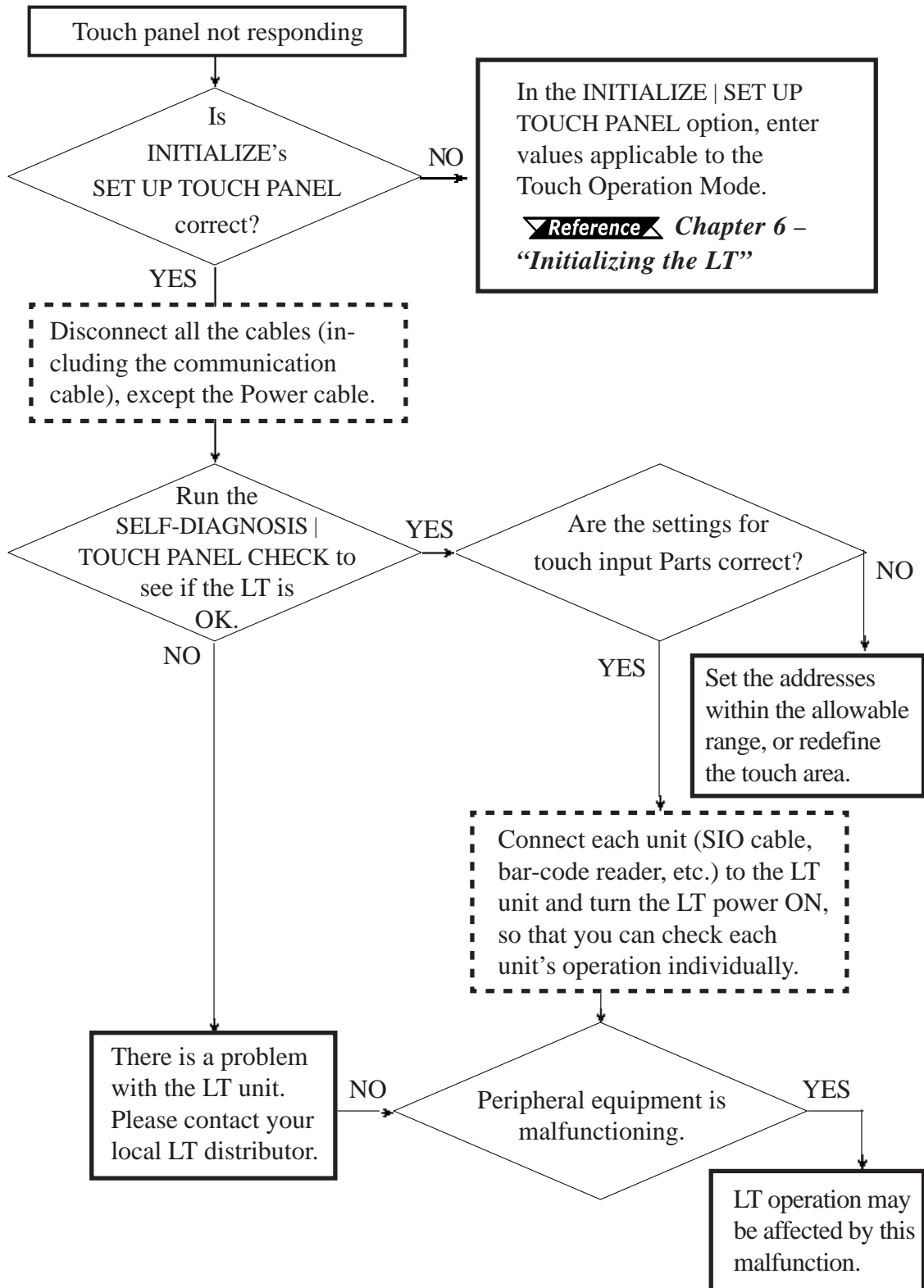


Chapter 7 – RUN Mode and Errors



7.2.4 Touch Panel Does Not Respond

When the touch panel does not respond, or when its response time is very slow after being touched, use the flowchart below to find the origin of the problem, and the appropriate solution.



Chapter 7 – RUN Mode and Errors

7.2.5 Cannot Execute Logic Program

Problem	Reason	Solution
Retentive area of control memory does not work	Battery Problem	Change the battery.
	Memory Problem	Change the memory unit.
Program Error	This is a program data transfer error. The data was not, but should have been, transferred from the data hold area to the RUN area.	Use LT Editor/C-Package to restart the Control feature. Reference Refer to the <i>LT Editor Operation Manual – Logic Program</i> and <i>Pro-Control Editor Operation Manual</i> (included with the LT Editor software).
	When RUN/STOP switchover is performed, the Hold CLEAR feature is enabled.	Turn this feature OFF.
After changing to RUN mode, control returns to STOP mode	Either a command performance alarm error has occurred, or a major error has occurred.	Debug the program. Check the System variable "#FaultCode."

7.2.6 Clock Settings Cannot be Entered

This problem occurs when the lithium backup battery's voltage, used for the internal clock, runs out. To enter the clock settings, please read the CLOCK SETUP ERROR directions.

Reference 7.4.2 Error Messages - Detail ■ CLOCK SETUP ERROR

7.2.7 Error Screens

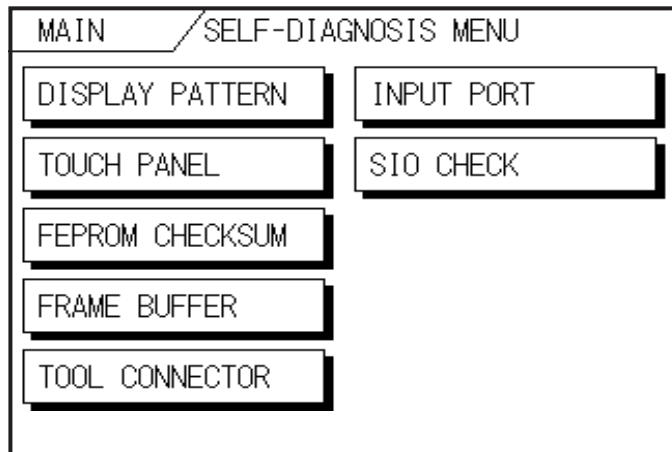
If the following error screen appears when you start the LT, it indicates an error has occurred and the LT is not set up correctly. Be sure to perform screen transfer (Force System Setup) again.

<p>システムがインストールされていません。 画面の転送(強制セットアップ)を行って ください。 This unit's system data was not downloaded. Please download the system data again (Force System Setup)</p>

7.3 SELF-DIAGNOSIS

The LT unit is equipped with a number of Self-Diagnosis features used to check its System and Interfaces for any problems.

7.3.1 SELF-DIAGNOSIS ITEM LIST



- **DISPLAY PATTERN**
Checks all the figures and tiling patterns.
- **TOUCH PANEL**
Checks each LT touch panel square.
- **FEPRM CHECKSUM**
Checks the System and Protocol of the LT Internal Memory (FEPRM).
- **FRAME BUFFER**
Checks the internal display memory (Frame Buffer)
- **TOOL CONNECTOR^{*1}**
Checks the Tool Connector control lines and send/receive lines.
- **INPUT PORT**
Checks the Input Port (For Pro-face's maintenance use only).
- **SIO CHECK^{*1}**
Checks the RS-232C and RS-422 send/receive lines.

1 The SIO CHECK requires special equipment (cable, connector, etc.). Please use the specified tool for the test.

Chapter 7 – RUN Mode and Errors

7.3.2 SELF-DIAGNOSIS - Details

This section explains the contents of SELF-DIAGNOSIS.

Reference *For information on how to operate the menu interface, see Chapter 5 – “OFFLINE Mode.”*

For information on how to set up the Special Tools, see Chapter 3 – “Installation and Wiring.”

■ DISPLAY PATTERN

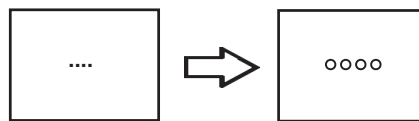
Used to check the drawing function when the buzzer does not sound and when the device contents do not display correctly. Checks are performed on the various screen pattern displays (8 screens), the ON/OFF Display, and the KANJIROM CHECKSUM. When the ON/OFF Display is checked, the Buzzer ON/OFF check is run simultaneously. If KANJIROM CHECKSUM is normal, **OK** displays. If there is a problem, **NG** displays.

■ TOUCH PANEL

Touch Panel check. Checks if each touch cell lights up when touched.

■ INTERNAL FEPRM CHECKSUM (Display Area)

The Internal FEPRM system and Protocol check searches for any problems that may occur during operation. When running the check, the screen changes as follows:



When the FEPRM is normal, **OK** displays. If there is a problem, the screen stops in the middle of operation. This check does not erase the System or Protocol.

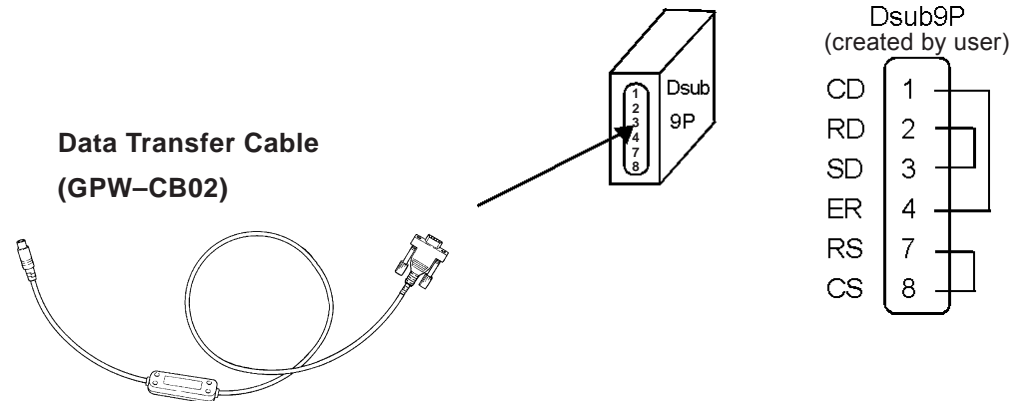
■ FRAME BUFFER

The Frame Buffer Check (display memory) looks for any display problems that may develop. When everything is normal, **OK** displays. When there is a problem, an error message displays.

■ TOOL CONNECTOR

Use the Tool Connector Control line and the Send/Receive line check when the LT cannot send and receive data from the PC. To run the check, it is necessary to connect the pin-side of the *Tool Connector Check Loop Back Cable* (Dsub9pin) to the LT unit's *Downloading Cable* (provided in the software package).

When everything is normal, **OK** displays. When there is a problem, an error message displays.



This check cannot be performed using the USB Data Transfer Cable (GPW-CB03).

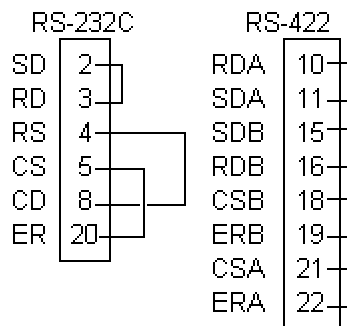
■ INPUT PORT

Used for Pro-face's maintenance checks only.

■ SIO CHECK

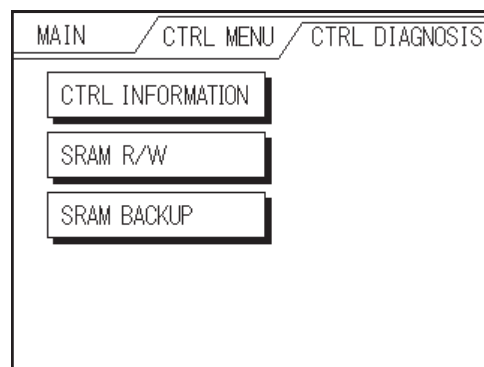
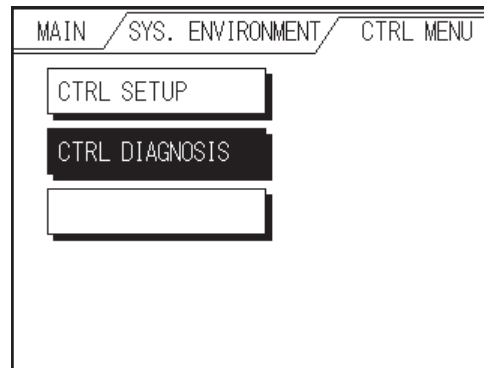
Checks the RS-232C and RS-422 SIO lines for areas where communication problems develop. In the menu, select which check to run. To run the check, it is necessary to connect the SIO cable. If all is normal, **OK** displays; if there is a problem, an error message appears.

The SIO cable wiring is as shown below (RS-232C, RS-422 common):



7.3.3 CONTROLLER SELF-DIAGNOSIS

The LT Editor/C-Package or LT controller setting data is written to non-resident memory. Each of the setting items below is assigned a default value, but, if necessary, be sure that your own settings are entered.



■ CONTROLLER DATA

Shows the current controller version data.

■ SRAM R/W

Performs an SRAM R/W (Read/Write) check. Writes the data required to perform the backup SRAM check.

■ SRAM BACKUP

Before performing this check, be sure to perform the above SRAM R/W check. Then, after turning the LT unit's power OFF and then ON, perform the SRAM BACKUP check.



Performing the checks listed below will delete all resident SRAM data.

7.4 Error Messages

This section explains the messages that appear when an error has occurred in the LT unit during RUN mode. The problem causing the error message and its related countermeasure are explained in the table below.

After a problem has been solved, unplug the LT unit's power cord and then reattach it. *(Only the latest error message will appear on the LT unit's screen.)*

7.4.1 Error Message List



Note: Indicates LT's peripheral devices (such as Temperature Controllers, Inverters, etc.). PLC is unable to connect to LT units.

Error Message	Problem	Countermeasure
SYSTEM ERROR (03 : **)	During screen data transfer, an unrecoverable error occurred.	Reference 7.4.2 Error Message Details
SYSTEM ERROR (** : ** : **)	During screen data transfer, an unrecoverable error occurred.	Reference 7.4.2 Error Message Details
ILLEGAL ADDRESS IN SCREEN DATA (00B:***:***)	Settings are used that overlap addresses.	Set the addresses correctly after checking the screen data.
UNSUPPORTED TAG IN SCREEN DATA	The LT currently in use does not support the desired feature.	Set the feature correctly after checking the screen data.
PLC NOT CONNECTED (02 : FF) and (02 : F7)	The communication cable is not connected correctly.	Re-connect the communication cable correctly.
PLC NOT RESPONDING (02 : FE)	PLC's power is not turned ON.	Turn ON the PLC's power.
	LT unit INITIALIZE settings (Setup I/O, PLC Setting) are incorrect.	Check the INITIALIZE settings and make any necessary corrections.
	The host and LT Powering Up sequence was incorrect.	Turn ON the PLC's power and wait for 2-3 seconds, then turn ON the LT unit's power.
RECEIVE DATA ERROR (02 : FD)	The communication cable is not connected properly.	Check the communication cable and connect it correctly.
	The communication cable was disconnected while the LT was ON.	Turn the LT OFF and then ON again.
	The LT was powered OFF, then ON during communication with PLC.	Turn the LT OFF and then ON again.
GP STATION NO. DUPLICATION ERROR (02 : F9)	Noise occurred in the communication cable.	Check the communication cable and connect it correctly.
	This LT unit's station number is same as another LT.	Check all LT station numbers, and set them so they are they do not overlap.
	PLC is powered OFF, then ON during communication with LT.	Turn the LT OFF and then ON again.

Chapter 7 – RUN Mode and Errors

Error Message	Problem	Countermeasure
NETWORK ADDRESS ERROR (02 : F8)	This LT uses an SIO address that is different than other LTs. (Only for the Multi-Link connection)	Check the SIO address setting of each LT, and make necessary corrections.
PLC COM. ERROR (02 : **)	Specific external device-related error, or an error has occurred with the external device.	▼ Reference ▲ 7.4.2 – “Error Message Details”
SCREEN MEMORY DATA IS CORRUPT (nnnn:mmmm)	Screen data is corrupted: <ul style="list-style-type: none"> • nnnn indicates the Screen Number that identifies the location of the error. • mmmm indicates the number of screens that have errors. (Decimal) 	Check the screens that have errors, correct all errors, and then transfer the screen data again.
CLOCK SETUP ERROR	The backup battery for the internal clock is running low.	▼ Reference ▲ 7.4.2 – “Error Message Details”
SCREEN TRANSFER ERROR	Indicates an error that has occurred in data transmission from the screen editor to the LT panel.	Re-transfer the screen data.
SCREEN TAG LIMIT EXCEEDED	Number of Tags exceed the max. 385-Tag limit	▼ Reference ▲ 7.4.2 – “Error Message Details”
OBJ. PLC HAS NOT BEEN SET UP (**)	The host external device that is set up in the Editor program does not match the external device in use.	▼ Reference ▲ 7.4.2 – “Error Message Details”

7.4.2 Error Messages - Details

■ SYSTEM ERRORS

Indicates a fault in the basic operations of the LT.

The error code is listed at the end of the error message (see below). Report the error code number and details about the error's occurrence to your local LT distributor.

◆ SYSTEM ERROR (03 : x x)

An unrecoverable error occurred during screen data transfer.

0 3 : x x

Error No.		
Constant Value		

◆ SYSTEM ERROR (x x x : x x x : x x x)

An unrecoverable error occurred during screen data transfer.

x x x : x x x : x x x

Error No. 1			
Error No. 2			
Error No. 3			

Possible Solutions

- Make sure that the LT unit's power cord and Input signal line have been separately wired.
- Make sure that the FG line has been grounded correctly, according to your country's standards.
- Re-send the screen data from the PC to the LT.
- If other types of communication errors, such as [RECEIVE DATA ERROR] or [PLC COM. ERROR], have occurred, try also to correct these problems.

▼ **Reference** ▲ *Section 7.4.1 – “Error Message List”*

If the above-mentioned methods do not solve the problem, please contact your local LT distributor.

Chapter 7 – RUN Mode and Errors

◆ When the LT Changes to OFFLINE Mode during RUN Mode

When the LT changes to OFFLINE mode without the user first touching the screen, the screen data may be damaged.

Approximately 10 seconds after the SYSTEM ERROR message displays, the screen automatically reverts to OFFLINE mode. Run the INITIALIZE MEMORY command and transfer the LT screen data again from your PC.

In most cases, system errors are related to the problems described below.

Environment-Related Problems

If an error's occurrence has no apparent relation to the LT unit's current operation, the condition of the LT unit's operating environment may be the cause. These conditions can include noise or electrostatic interference in the power cord or the communication line. Make sure that the power cord and communication line wiring, and the FG grounding are correct.

Screen or Project Data-Related Problems

If an error seems to be caused by a particular LT operation, the error may be related to the screen or project data transferred to the LT. Try to send the screen data via the FORCE SYSTEM SETUP feature, which then transfers both the screen data and the project data to the LT.

LT-Related Problems

If disconnecting and then reconnecting the power cord corrects an error, the problem may not be related to the LT unit itself. To identify any problems with the LT unit, run the OFFLINE mode's SELF-DIAGNOSIS program.

Continuously-Occurring Communication Errors (when using the Direct Access method)

If the LT defines a communication error that occurs continuously as a system error, you need to solve the problem that originally caused the communication error.

■ ILLEGAL ADDRESS IN SCREEN DATA

Caused by an overlap of addresses.

The error code is listed at the end of the error message (see below). If the error cannot be corrected, please report the error code and details about the error's occurrence to your local LT distributor.

ILLEGAL ADDRESS IN SCREEN AREA (00B : XXX : XXX)

Error No. 1
 Error No. 2
 (see table below)

If the above-mentioned methods do not solve the problem, please contact your local LT distributor.

Illegal Addresses

Error 1	Error 2	Meaning
0C2	194	The Trend Graph's address is duplicated in the Alarm Message's address setting.
	195	
	196	
0C3	197	The Alarm Message's address is duplicated in the Trend Graph's address setting.
	198	
	199	





In addition to the above errors, other errors (such as Address Out of Range) can also produce an Illegal Address Error.

Chapter 7 – RUN Mode and Errors

■ PLC COM. ERROR

Appears when the address setup for tags exceeds the address range used in the host (PLC/external device). Check the Error Number, and use the following table to solve the problem.

PLC COM. ERROR (02 : x x)

Constant Value 
 Error Code 
 (see table below)


Error	Problem	Countermeasure
FC	The communication settings for this unit do not match the host's settings.	Change the SIO communication settings to match the host's.
FB	The address used for storing Trend graph data, or the address set by an alarm message is not within the specified range (Address Range Error).	When using Memory Link type, set the addresses within the set range of the System Data Area (0 to 2047), and resend the correct data.
FA	Address Range Error	Set the addresses within the allowable range.
Other	Lists the Error Number from the PLC.	<p>▼ Reference ▼</p> <p><i>For information about the Error Number, refer to the corresponding PLC manual, or contact the PLC manufacturer.</i></p>

■ CLOCK SETUP ERROR

This message displays when the power level of the lithium backup battery (the battery used for the internal clock) is running low. To reset the error, you need to turn the LT unit's power OFF and then ON again. Let the LT run continuously for 24 hours to sufficiently charge the battery for backup, and for approximately 96 hours to fully charge the battery.

If the battery is incorrectly replaced, it may explode. To reduce the risk of danger, do NOT replace the battery yourself. When the battery needs replacing, please contact your local LT distributor.

After changing the backup battery, set up the internal clock.

 **Reference** *Chapter 6 – “Initializing the LT”*



Note: The lifetime of the backup battery depends on the ambient temperature and the amount of current being charged and used. The table below gives a general indication of how long the battery will last.

Battery Temperature	40° C or lower	50° C or lower	60° C or lower
Expected Lifetime	10 years or longer	4.1 years or longer	1.5 years or longer

■ SCREEN TAG LIMIT EXCEEDED (max. 384 Tags)


When the number of Parts exceeds the 384–Tag limit, any extra Tags are disabled, and the load screen operation is disabled when you try to load screens, beginning with the screen you loaded last.

To correct this problem, reduce the number of Tags to within the allowed limit.

■ OBJ. PLC HAS NOT BEEN SET UP

The following error message is displayed when the PLC/external device you specified in the .PRW file transferred from LT Editor/C-Package to the LT unit does not match the PLC/external device physically connected to the LT unit. When this occurs, do the following. In LT Editor/C-Package, select [Setup/Transfer settings] in the [Transfer] dialog box, and select [Automatic Setup], before transferring the file again.

OBJ. PLC HAS NOT BEEN SETUP (x x)


 The external device number
 (Hexadecimal) as set up in the
 LT Editor/C-Package.

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Chapter 8 Maintenance

1. Regular Cleaning
2. Periodic Check Points
3. Changing the Backlight

8.1 Regular Cleaning

8.1.1 Cleaning the Display

When the surface or the frame of the display gets dirty, soak a soft cloth in water with a neutral detergent, wring the cloth tightly, and wipe the display.



- Do not use paint thinner, organic solvents, or strong acid compounds to clean the LT unit.
 - Do not use hard or pointed objects to operate the touch-screen panel, since they can damage the panel's surface.
-

8.1.2 Installation Gasket Check / Replacement

The installation gasket protects the LT and improves its water resistance.

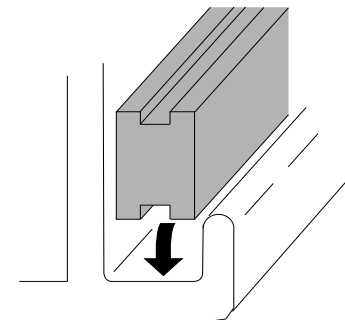
Reference For instructions on installing the LT unit's gasket, see *Chapter 3 – "Installation and Wiring."*



A gasket which has been used for a long period of time may be scratched or dirty, and may have lost much of its water resistance. Be sure to change the gasket at least once a year, or when scratches or dirt become visible.

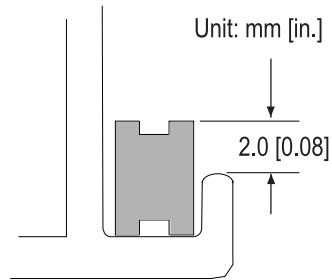
■ Installation Gasket Attachment Procedure

1. Place the LT on a level surface with the display panel facing downwards.
2. Remove the gasket from the LT.
3. Insert the new water-resistant gasket. Make sure that the grooved sides face the top and bottom.



Chapter 8 – Maintenance

4. Confirm that the water-resistant gasket is correctly installed.



- If the water-resistant gasket is not properly inserted into the groove, the gasket's moisture resistance may not be equivalent to IP65f.
- When the water-resistant gasket is properly installed, approximately 2.0 mm of it will extend outside the groove. Before mounting the LT to the panel, be sure to confirm that the gasket is correctly installed.

8.2 Periodic Check Points

To keep your LT unit in its best condition, inspect the following points periodically.

LT Operation Environment

- Is the operating temperature within the allowable range (0° C to 50° C)?
- Is the operating humidity within the specified range (10% RH to 90% RH)?
- Is the operating atmosphere free of corrosive gases?

Electrical Specifications

- Is the input voltage appropriate (DC 20.4V to DC 28.8V)?

Related Items

- Are all power cords and cables properly connected? Have any cords or cables become loose?
- Are all mounting brackets holding the unit securely?
- Are there many scratches or is there much dirt on the installation gasket?

8.3 Replacing the Backlight

The LT unit's backlight should NOT be replaced by the user.

Although the LT is equipped with a long-life, cold-cathode tube backlight, the backlight will eventually need to be replaced.

Monochrome model: 25,000 hours (Approximately 2.8 years)

Color model: 36,000 hours (Approximately 4.1 years)

“Service life” refers to the period after which the brightness decreases to about half the brightness of a new product — assuming continuous (24 hour/day) illumination at normal temperature.

For backlight replacement, please contact your local LT distributor.

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