

Preface

Thank you for purchasing Digital's Pro-face GLC300 Series of Graphic Logic Controllers (hereafter referred to as the "GLC unit").

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

Also, in this manual's examples, the Mitsubishi MELSEC-AnA Series PLC is used whenever possible.

<Note>

- 1) It is forbidden to copy the contents of this manual, in whole or in part, except for the user's personal use, without the express permission of the Digital Electronics Corporation of Japan.
- 2) The information provided in this manual is subject to change without notice.
- 3) This manual has been written with care and attention to detail; however, should you find any errors or omissions, please contact Digital Electronics and inform them of your findings.
- 4) Please be aware that we are not responsible for any damages resulting from the use of our products, regardless of article 3 above.
- 5) This product conforms to the CE Marking and cUL standards. However, be aware that, when using this product together with expansion units that do not conform to those standards, this product may not perform consistent with those standards.

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Safety Precautions

This manual includes the information that must be followed in order to operate the GLC correctly and safely. Be sure to read this manual as well as any related manuals to thoroughly understand the correct operation and functions of your GLC.

Usage of Icons

Throughout this manual, to insure that you to use the GLC correctly, the following icons are provided next to the items requiring special attention. The items described with these icons contain essential safety information. Be sure to follow the information. The following is an example of the icons and their meanings:



Indicates situations where severe bodily injury, death or major machine damage will occur.



Indicates situations where severe bodily injury, death or major machine damage can occur.



Indicates situations where slight bodily injury or machine damage can occur.



Design Precautions

- Set up all safety circuit(s) outside the GLC to ensure that the entire system operates appropriately to ensure safety, even when an external power or GLC unit malfunction occurs. Otherwise, an accident can occur due to incorrect signal output or incorrect operation.
 - (1) Set up all emergency stop and protection circuits, interlock circuits for opposite movements such as forward and reverse revolutions, and interlock circuits for machine damage protection such as upper, lower and run (drive) limits in positioning, outside of the GLC.
 - (2) When the GLC's watchdog timer error and other errors are detected, operation and function performance is stopped. Also, if an error occurs that the GLC cannot detect, such as an input/output control equipment error, unexpected action can be taken in the input/output control sections. To prevent this, be sure to set up all fail-safe circuits and system mechanisms outside the GLC.

Reference *For fail-safe circuit details, refer to 3.3 Installation Precautions.*

- (3) If an output unit's relay or transistor malfunction occurs, output can remain ON or OFF. With any output signals that can cause a serious accident, be sure to set up a circuit outside the GLC to monitor these signals.
- Set up the circuits so that, prior to turning ON the GLC unit's main power, all I/O units and load control power connected to the GLC is turned ON. If the load control power starts after the GLC's program starts RUN operation, it can cause an accident due to incorrect output or operation.
 - Set up all interlock circuits in the logic program so that, when a communication error or automatic power shut-off occurs in the external equipment connected to the GLC's display or control function or the GLC unit itself, the system operates in a manner that will ensure operation safety. Otherwise, an accident can occur due to incorrect output or operation.
 - Do not install switches used to control machine safety operation, such as an emergency stop switch, as a GLC touch screen icon. Be sure to install these switches as separate in hardware switches. Otherwise, bodily injury or damage can be caused.

WARNING

Wiring Precautions

- Prior to installing the unit or when connecting any cables and lines to the GLC, be sure to confirm that the power cable is not connected, to avoid the possibility of an electric shock.
- After wiring is completed, be sure to replace the terminal block's plastic cover, otherwise, an electric shock can occur.
- High voltage runs through the GLC. Except for replacing the backlight, NEVER disassemble the GLC, otherwise, an electric shock can occur.
- Do not use the GLC in an operating environment that is inconsistent with that designated by this manual's specifications since it can cause an electric shock, fire, malfunction, or damage to the GLC.
- Do not use the GLC in an environment where flammable gasses are present, otherwise, operating the GLC may cause an explosion.

Start-up and Maintenance Precautions

- Do not touch the power terminals while the GLC's power is ON, otherwise, an electric shock or incorrect operation can occur.
- Prior to cleaning the unit or retightening the terminal screws, be sure to confirm that the GLC's power cable is not connected. Otherwise, an electric shock can occur.
- Prior to replacing the backlight, be sure to disconnect the unit's power cord and wear gloves to prevent burns or an electric shock.
- The GLC uses a lithium battery for its internal clock and for backing up control memory data. If the battery is incorrectly replaced (i.e. if the + and - sides are reversed), the battery can explode. Therefore, before replacing the battery, Digital recommends you contact your local GLC distributor.
- Do not modify the GLC, otherwise, an electric shock or fire can occur.



CAUTION

Circuit Design Precautions

- Be sure to install all input and output signal lines in a separate conduit, away from all power cables. Otherwise, incorrect GLC operation may occur due to power cable noise.

Reference 3.2.4 *Input and Output Signal Line Wiring Precautions*

Installation Precautions

- Be sure to use the attachment screws (accessory) to attach the I/O unit to the GLC. If the I/O unit is not attached correctly, incorrect GLC operation may be caused, the I/O unit may malfunction or fall off the back of the GLC unit.
- Be sure to securely connect all cables to their connectors, and confirm that all the set screws and pinch-clips are secured. Otherwise, incorrect input or output may be caused due to insufficient contact.

Wiring Precautions

- Ground the GLC FG line separately from other units' FG lines. Otherwise, an electric shock or incorrect operation may occur. Be sure to use a grounding resistance of 100Ω or less and a 2mm² or thicker wire, or your country's applicable standard.
- In order to perform wiring of the GLC correctly, be sure to confirm that the rated voltage and terminal layout are within the designated specification range. If the supplied voltage differs from the rated one, or incorrect wiring or grounding is performed, it may cause a fire or unit malfunction.
- Use the designated torque to tighten the terminal block screws. If these screws are not tightened firmly, it may cause a short-circuit, fire, or incorrect operation.
- Be careful that metal filings and wiring debris do not fall inside the GLC. Otherwise, a fire, unit malfunction, or incorrect operation may occur.

Start-up and Maintenance Precautions

- Prior to performing a program change, forced program change, RUN, STOP, or PAUSE operations during regular GLC operation, be sure to read this product's instruction manual(s) and on-line help information and understand them thoroughly to ensure the safe operation of your GLC. Incorrect operation may cause an accident or machine damage.
- Prior to attaching or removing the I/O unit, be sure to confirm that the GLC's power cable is not connected. If the attachment or removal of the I/O unit is performed while the power cable is connected, the I/O unit may malfunction or incorrect operation may occur.

GLC Disposal Precautions

- When disposing of this unit, process it as you would industrial waste.

To Prevent GLC Damage:


- Never strike the touch panel with a hard or heavy object, or push on the touch panel with too much force, since it may damage the unit.
- If the GLC is used in an environment with temperatures and humidity in excess of the allowed range, the GLC may malfunction and/or its useful life may be shortened.
- Do not allow water, liquids, metal particles, or charged particles to enter inside the GLC's chassis, since they can cause either a GLC malfunction or an electrical shock.
- Do not use this unit in areas where the temperatures can change drastically, causing condensation to form inside the unit. This can cause the unit to malfunction.
- Avoid restricting the GLC's naturally occurring ventilation, or storing or using the GLC in an environment that is too hot.
- Avoid using or storing the GLC in direct sunlight, or in excessively dusty or dirty environments.
- Because the GLC is a precision instrument, do not store or use the GLC where a sudden shock or excessive vibration can occur.
- Do not store or use the GLC where chemicals and acids evaporate, or where chemicals and acids are present in the air.
- Do not use paint thinner or organic solvents to clean the GLC.
- Due to the danger of unforeseen accidents, be sure to back up the GLC's screen data and logic programs regularly.
- After turning this unit OFF, be sure to wait a few seconds before turning it ON again. If the unit is started too soon, it may not start up correctly.

About the GLC's Display Panel:

- The Display Panel contents and the Contrast Adjustment affect the intensity of *Contouring*. (i.e, when some parts of the screen are brighter than others, creating a wavelike pattern)
- There are minute grid-points(dark or light) on the Display Panel's surface. This is part of the GLC's design and not a defect.
- Shadows may appear at the top of the LCD. This is normal for an LCD display.
- Sometimes the display area may look as if the display colors have changed. This is a common attribute of LCD's and is not a defect.
- Displaying a single image for long periods can cause an afterimage to remain when the display is changed to another screen.

To prevent this effect:

- Set up the GLC's "Stand-by Mode", which turns the screen OFF automatically when there is no input for a specified period of time.

Reference  **5.3.1 SYSTEM SETUP**

- Do not display any single screen for a long period of time. Try to always change the screen display periodically.

About cUL Approval

The GLC300-TC41-24V graphic logic controller is cUL compliant (UL file No.E182139).

The GLC complies with the following standards:

- UL508

Industrial Control Equipment

- UL1604

Electrical Equipment for Use in Class I and II, Division 2, and Class III Hazardous (Classified) Locations

- CAN/CSA-C22.2, Nos.142, and 213-M1987

Standards regarding the safety of the information technology equipment including electrical office appliances

GLC300-TC41-24V (UL file No.: 2780027-02)

- This unit must be installed so that its front face faces the user.
- If natural air cooling is used, the GLC must be installed into an upright panel. In addition, an open space of 100 mm or more is required in all directions behind the unit's rear face. Unless this requirement is satisfied, the temperature inside the GLC's components may rise beyond the limit specified by UL standards.

UL1604 Compliance Conditions and Operating Precautions

1. Power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods, Article 501-4 (b) of the National Electrical Code, NFPA 70 or as specified in Section 18-152 of the Canadian Electrical Code for installations within Canada and in accordance with the authority having jurisdiction.
2. Suitable for use in Class I, Division 2, Groups A, B, C and D hazardous location, or nonhazardous locations only.
3. **WARNING:** Explosion hazard-substitution of components may impair suitability for Class I, Division 2.
4. **WARNING:** Explosion hazard-do not disconnect equipment unless power has been switched off or the area is known to be nonhazardous.
5. **WARNING:** Explosion hazard-when in hazardous locations, turn off power before replacing or wiring modules.

CE Marking Information

The GLC300-TC41-24V graphic logic controller is CE-marked product complying with EMC directives EN550081-2 and EN50082-2.

What is IP65f?

This unit's protection rating of IP65f is actually a composite code, consisting of the internationally recognized British "Ingress Protection" standard (BS EN 60529:1992) - "IP65", and the standard developed by the Japanese Electronics Manufacturer's Association (JEM) - "f". This code is used in this manual to identify a given product's degree of structural resistance to a variety of environmental elements and thus, prevent problems or accidents related to the inappropriate use of a product.

The individual meaning of each character of this code is explained below. This code indicates the degree of ingress protection provided from the front face of the GLC, and assumes that the GLC is securely mounted into a metal panel.

IP 6 5 f

(1) (2) (3) (4)

(1) Designates the type of protection provided.

(2) Indicates the degree of protection provided to the human body by the unit, and the degree of protection provided by the unit's front face from particles/dust intrusion into the interior of the unit.

Here, "6" indicates that the unit is completely protected from dust intrusion.

(3) Indicates the degree of protection provided by the unit's front face from water intrusion into the interior of the unit.

Here, "5" indicates that the unit is protected from water intrusion from a direct water jet.

(4) Indicates the degree of protection provided by the unit's front face from oil particle intrusion into the interior of the unit.

Here, "f" indicates that the unit is completely protected from oil intrusion via either oil particles or oil splashes from any direction (to the front panel).



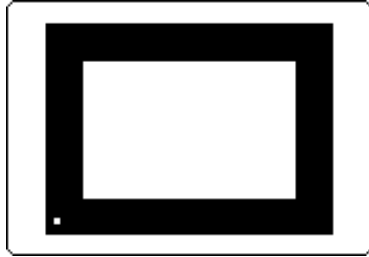
Note: For information about the GLC's protective structure, refer to page 2-3.

Package Contents

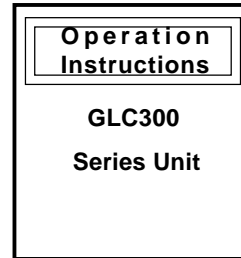
The GLC's packing box contains the items listed below. Please check to confirm that all items shown below have been included.

GLC Unit (1)

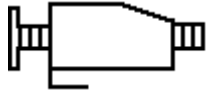
GLC300-TC41-24V



Operation Instructions (1)



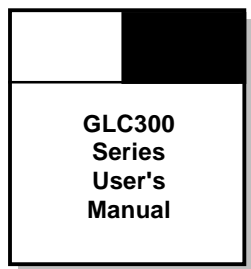
Installation fasteners (4/set)



This unit has been carefully packed, with special attention to quality before shipment. However, should you find anything damaged or missing, please contact your local GLC distributor immediately for prompt service.

GLC300 Series




User's Manual (sold separately)



(this book)

Symbol Information

The list below describes the symbols used in this manual.

Symbol	Meaning
 Important	Failure to observe this instruction may cause abnormal operation of equipment or data loss.
Pro-Control Editor	Name of software that creates, transfers, and monitors the GLC's logic program.
GLC	Represents the GLC300-TC41-24V
GP Screen Editor	Indicates the GP-PRO/PBIII for Windows Ver. 3.0 (or later) screen editor software.
Logic Program	Represents the ladder program that is created using the Pro-Control Editor software.
*1	Indicates useful or important supplemental information.
 Note:	Used to provide useful or important supplemental information.
 Reference	Used to refer to useful or important supplemental information.
PLC	Abbreviation for Programmable Logic Controller.

MEMO

Chapter 1

Introduction

1. Operating the GLC
2. System Design
3. Optional Equipment

1.1 Operating the GLC

The following example procedures are required for starting to use the GLC.

- 1 Preparation**

Before using the GLC, check that all required hardware is present and read all specification, wiring, and installation information.
Reference *Chapter 2, Specifications, and Chapter 3, Installation and Wiring*
- 2 Design**

Design the GLC screen images, layout of tags and logic program.
- 3 Screen Editor Software Installation**

Install the screen editor software in your personal computer.
Reference *GP-PRO/PBIII for Windows Operation Manual (included in the screen editor software package)*
- 4 Logic Program Development Software Installation**

Install the logic program development software in the personal computer where the screen editor software has already been installed.
Reference *Pro-Control Editor Operation Manual (included in the Pro-Control Editor package)*
- 5 Logic Program Creation**

Use the logic program development software to create the logic program, set up the operation modes.
Reference *Pro-Control Editor Operation Manual (included in the Pro-Control Editor software package)*

- 6 Symbol Import/Screen Creation/Active Image Setup/Screen Data Transfer** Register symbols and create screens via the screen editor software and transfer the data to the GLC unit.
Reference *GP-PRO/PBIII for Windows Operation Manual (included in the screen editor software package)*
- 7 Logic Program Transfer/Monitor** Use the logic program development software to transfer the program to the GLC unit. The transferred logic program can be checked via the logic program development software's monitor feature.
Reference *Pro-Control Editor Operation Manual (included in the Pro-Control Editor software package)*
- 8 Initial Settings** Perform GLC's initial settings, according to the type of usage.
Reference *Chapter 5, Initializing the GP, and the GP-PRO/PB III for Windows PLC Connection Manual (included in the screen editor software package)*
- 9 Operation** Connect the GLC and expansion unit, as well as peripheral devices required, and start operation.
Reference *GP-PRO/PBIII for Windows PLC Connection Manual (included in the screen editor software package) and each expansion unit's User's Manual*

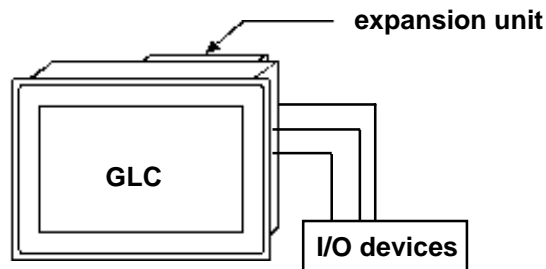
1.2 System Design

1. System Configuration

The GLC can be used in either of the following systems.

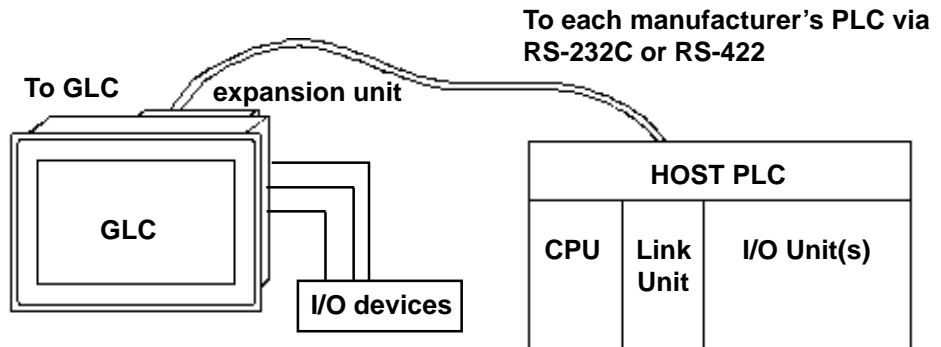
■ Stand-alone System

The expansion unit can be attached to the GLC to perform I/O control.



■ PLC Connection System

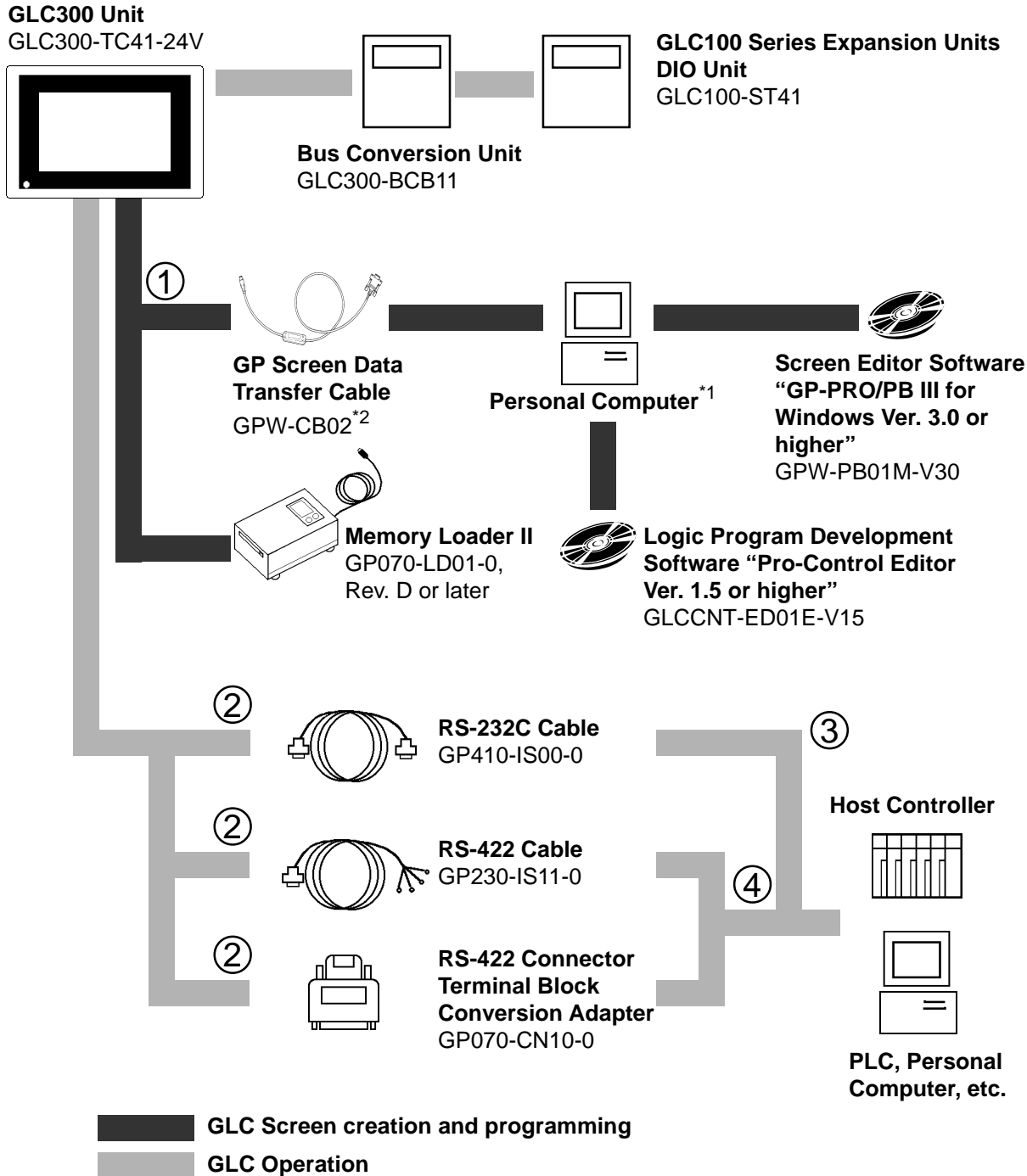
Connecting the GLC to a PLC allows you to send data between the GLC and a PLC. At the same time, the Expansion unit can also be attached to the GLC to perform I/O control.



Important • When attaching the expansion unit to the GLC300, a bus conversion unit (model No.: GLC200-BCB01) is also required.

2. Product Line Up

The following peripheral devices can be used being connected with the GLC300 unit:



*1 Personal computer running Windows95/98/NT4.0

*2 GPW-CB-SET can also be used.

Chapter 1 - Introduction

Items shown with the codes ① to ④ should be connected to the following devices.

GLC Interface

- ① Tool connector
- ② Serial interface

PLC/Personal Computer Interface

- ③ RS-232C port
- ④ RS-422 port

1.3 Optional Equipment

The following are the GLC's optional items, which are sold separately.

■ Expansion Unit

◆ I/O Unit

Product Name	Model No.	Description
DIO Unit	GLC100-ST41	<ul style="list-style-type: none"> • When using with the GLC300 Series, a bus conversion unit is required. • Up to 2 units can be attached to the GLC unit's rear face. • Via the user program, GLC can perform direct I/O control. (Input: 16 points, Output: 16 points)

■ Expansion Unit Option

Product Name	Model No.	Description
Bus Conversion Unit	GLC300-BCB11	<ul style="list-style-type: none"> • Attached to the GLC unit's rear face. (When attaching any I/O unit to the GLC300, this unit is required.)

■ Available Software

Product Name	Model No.	Description
Pro-Control Editor Ver.1.5	GLCCNT-ED01E-V15	<ul style="list-style-type: none"> • Ver. 1.5 or higher is required. • Logic program development software • Program creation • System settings • Program download/upload • Program debugging, and ladder/device monitor feature to monitor operation status
GP-PRO/PBIII for Windows Ver.3.0	GPW-PB01M-V30 <CD-ROM version>	<ul style="list-style-type: none"> • Ver. 3.0 or higher is required. • Software to be used to create the GLC's screen data using a personal computer.

■ Tool Connector


Product Name	Model No.	Description
Memory Loader II	GP070-LD01-0, Rev. D or later	<ul style="list-style-type: none"> • Copies data (system and screen data) from the GLC to GLC.
Screen data transfer cable set	GPW-CB02	<ul style="list-style-type: none"> • Connects the GLC to a personal computer. Transfers screen data and user program(s).

Chapter 1 - Introduction

■ Serial Interface


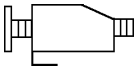

Product Name	Model No.	Description
RS-232C cable	GP410-IS00-0	Interface cable between the host (PLC) and GLC.
RS-422 cable	GP230-IS11-0 GP230-IS12-0	Connects the GLC to a personal computer. Transfers screen data and user program(s).
RS-422 connector terminal block conversion adapter	GP070-CN10-0	Conversion adapter to convert serial data to RS-422 format.

■ Option

Product Name	Model No.	Description
Screen protection sheet 	Hard type: GP570/577-DF10 Soft type: GP570/577-COV ER-10P	Disposable protective and dirt-resistant sheet for the GLC's screen. The GLC's touch panel can be used with this cover sheet attached.

■ Optional Maintenance Items

These optional items were included in either GLC itself or its packing box. These items are sold separately as optional maintenance items.

Product Name	Model No.	Description
Backlight bulb 	GP577RT-BL00-MS	Replacement backlight bulbs for GLC300 units.
Installation fastener 	GP070-AT00-MS	Fasteners to attach the GLC to a panel.
Moisture resistant gasket 	GP577R-WP11-MS	Provides a moisture resistant seal when installing the GLC. Same as the seal included in the GLC's original equipment package.



Chapter 2

Specifications

1. General Specifications
2. Features and Performance
3. Interface Specifications
4. Names and Functions of GLC Parts
5. Graphic Logic Controller Dimensions

2.1 General Specifications

1. Electrical Specifications

Rated Power Supply	DC24V±20%
Power Consumption	50W or less (TYP 20W)
Allowable Pause Duration	20ms or less
Voltage Endurance	AC1000V—10mA 1minute (between the live wire and grounding terminals)
Isolation Resistance	DC500V—above 10MΩ (between the live wire and grounding terminals)
Electrostatic Resistance	ESD-3 6kV

2. Environmental Specifications

Ambient Operating Temperature	0 to 40 degrees Celsius
Ambient Storage Temperature	-10 to 60 degrees Celsius
Operating Humidity	30 to 85%RH (non-condensing)
Shock Resistance	Half sine wave, peak 15G, during operation: 11µs continuous
Vibration Resistance	10 to 25 Hz (X, Y, Z directions - 30 minutes each, 2G)
Noise Immunity (via noise simulator)	Noise voltage: 1000 Vp-p
	Pulse length: 1 microsecond
	Arise time (rise/fall): 1 nanosecond
Air Pressure Resistance (ambient altitude)	800 to 1114 hpa (less than 2000m above sea level)
Operating Atmosphere	Must be free of corrosive gasses
Grounding	100Ω or less grounding resistance or your country's applicable standard
Air Purity Level	Purity Level 1: less than 0.1mg/m ³ (free of charged particles)
Rating*1	Equivalent to IP65f (JEM1030) and NEMA #250 TYPE4X/12

**1 The front face of the GP unit, installed in a solid panel, has been tested using conditions equivalent to the standards shown in the specification . Even though the GP unit's level of resistance is equivalent to these standards, oils that should have no effect on the GP can possibly harm the unit. This can occur in areas where either vaporized oils are present, or where low viscosity cutting oils are allowed to adhere to the unit for long periods of time. If the GP's front face protection sheet becomes peeled off, these conditions can lead to the ingress of oil into the GP and separate protection measures are suggested. Also, if non-approved oils are present, it may cause deformation or corrosion of the front panel's plastic cover. Therefore, prior to installing the GP be sure to confirm the type of conditions that will be present in the GP'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, you need to replace the installation gasket regularly.

3. Structural Specifications

External Dimensions (mm)	317W x 243H x 85D mm (GLC unit only)
Weight	Under 3.5 kg (GLC unit only)
Cooling Method	Natural air circulation

2.2 Features and Performance

1. Display Features

Display Medium	TFT type color LCD	
Display Color	64 colors (RGB-4 levels)	
Backlight	CFL (lifespan = 40,000 hours)	
Resolution	640 x 480 pixels	
Display Area	211.2W x 158.4H	
Attributes	Blink/Reverse Video	
Brightness	Four levels of adjustment available via touch panel.	
Character Sets	Korean: (KSC5601 - 1992 codes) Hangul fonts (including Kanji)	
	Chinese: (GB2321-80 codes) simplified Chinese fonts	
	Taiwanese: (Big 5 codes) traditional Chinese fonts	
	ASCII: (Code Page850) Alphanumeric (incl. European fonts)	
	Japanese: ANK 158 type, Kanji:6962 (Standard JIS Type 1 & 2)	
No. of	8x8 dots	80 Char. per row, 60 rows
Char.	8x16 dots	80 Char. per row, 30 rows
Disp	16x16 dots	40 Char. Per row, 30 rows
Character Size	Both height and width can be expanded 1, 2, 4, or 8 times. Single-byte characters larger than 2 times size (32 x 32) can be displayed in a high quality font.	

2. Screen Memory

Internal Memory	FLASH EPROM 2M bytes
Backup Memory	SRAM 96K bytes Backup Memory uses lithium batteries. *1

3. Touch Panel / Clock Accuracy

Touch Panel	32 x 24 keys/screen (1 or 2 point touch)
Clock Accuracy	±65 seconds/month (at room temperature)



- The GLC's internal clock has a slight error. At normal operating temperatures and conditions, with the GLC 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 +90 to -380 seconds per month. For systems where this degree of error will be a problem, the user should be sure to monitor this error and make adjustments when required.
- To input the correct time into the System Data Area's time settings, use the GLC's OFFLINE mode. (Date information can be entered as well)


*1 The battery life of the GLC300's lithium battery at 40°C or less is over 10 years. At 50°C or less it is over 4.1 years, and at 60°C or less it is more than 1.5 years. The backup time period lasts approximately 60 days in its initial condition (fully charged), and approximately 6 days when the battery life is almost finished.

4. External Interfaces

Serial Interface	Asynchronous Transmission Method: RS232C/RS422 (Supports various protocols) Data Length: 7 or 8 bits Stop Bit: 1 or 2 bits Parity: None, Odd or Even Data Transmission Speed: 2400 to 115.2kbps
Auxiliary Input/Output (AUX)	Touch Switch Output (for inching): DC 24V 8 points System Alarm Output: DC24V 1 point Buzzer Output: DC24V 1 point RUN Output: DC24V 1 point Remote Reset Input: DC24V 1 point
Printer Output	Conforms to Centronics standards HP LaserJet PCL4 compatible, NEC PR series, EPSON ESC/P24 or equivalent can be connected) *1
Tool Connector	Synchronous TTL level nonprocedural command I/F <During Screen and Program Development> Used as the interface to download data from the GP screen editor software or Pro-Control Editor software. <During Operation> Used as a bar code reader's interface

5. Control Memory

SRAM Backup Memory	SRAM 32K bytes Backup Memory uses lithium batteries. *2
--------------------	--

Reference  When replacing the lithium battery, refer to **6.4.2 Error Message Details; CLOCK SETUP ERROR.**

*1 Printers designed only for Windows cannot sometimes be used. Be sure to use a printer that can be used with the MS-DOS system and supports either ESC/P or NEC-PR command system.

*2 The battery life of the GLC300's lithium battery, when the battery is 40°C or less is over 10 years. At 50°C or less it is over 4.1 years, and at 60°C or less it is more than 1.5 years. The backup time period lasts approximately 60 days in its initial condition (fully charged), and approximately 6 days when the battery life is almost finished.

2.3 Interface Specifications

1. Printer Interface

Pin Connection	Pin #	Signal Name
	1	$\overline{\text{PSTB}}$
	2	PDB0
	3	PDB1
	4	PDB2
	5	PDB3
	6	PDB4
	7	PDB5
	8	PDB6
	9	PDB7
	10 ^{*1}	$\overline{\text{INIT}}$
	11	BUSY
	12	Reserved
	13	Reserved
	14	GND

Recommended Connector : FCN-787P014-G/R (made by Fujitsu, Inc.)

Recommended Cover : FCN-780C014-D/E (made by Fujitsu, Inc.)

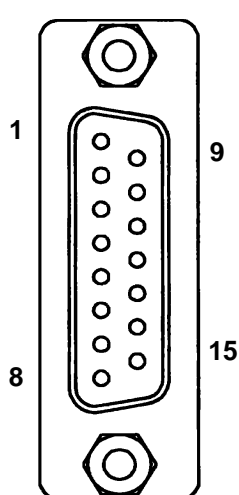


- **Do not connect pins 12 and 13 to anything.**

**1 When the $\overline{\text{INIT}}$ signal is not used, No.10 pin does not need to be connected.*

When a cable other than Digital's recommended cable is used, pin No. 10 may or may not be connected.

2. AUX I/F (Input/ Output)

Pin Connection	Pin #	Signal Name	Contents
	1	TSW0	Touch Switch Output (8 bit)
	2	TSW1	
	3	TSW2	
	4	TSW3	
	5	TSW4	
	6	TSW5	
	7	TSW6	
	8	TSW7	
	9	RUN	Outputs signal when GLC is running, No output during power interruption, or when GLC is in standby mode.*1
	10	ALARM	Alarm Output: when On, enables GLC unit alarm.*1
	11	BUZZ	Buzzer Output
	12	DC24V	Output--Common (DC24V)
	13	AIN - C	Input--Common (DC24V)
	14	AOUT - C	Output--Common (DC24V)
	15	RESET	Reset Input

Dsub15-pin Plug : XM2A-1501 (made by Omron Corp.)

Dsub15-pin Cover: XM2S-1511 (made by Omron Corp.)

Screws: XM2Z-0071 (made by Omron Corp.)



- Use rough metric type M2.6x0.45p threads used to hold the cable's set (fastening) screws in place.

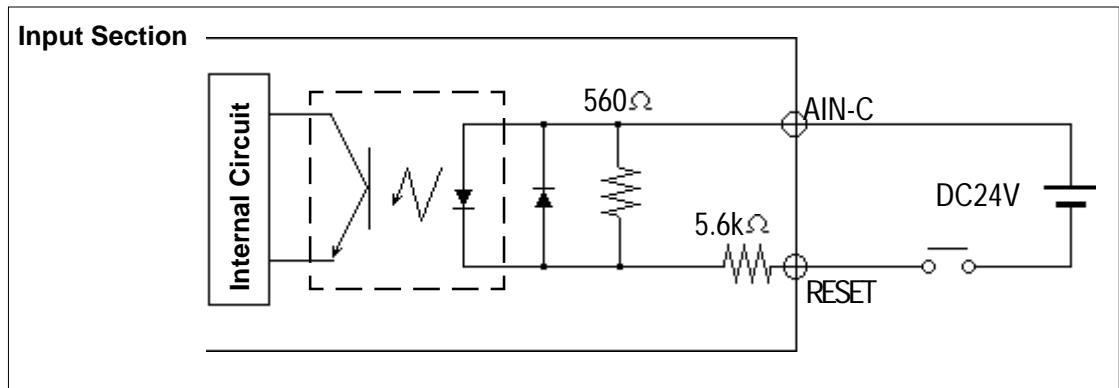
***1** AUX Input/Output I/F's pin No. 10 Alarm

The AUX Alarm will occur in the following two cases:

- Hardware Alarm (SCREEN MEMORY CHECKSUM ERROR)
- Software Alarm (SYSTEM ERROR, i.e., incorrect data that makes screen operation impossible)

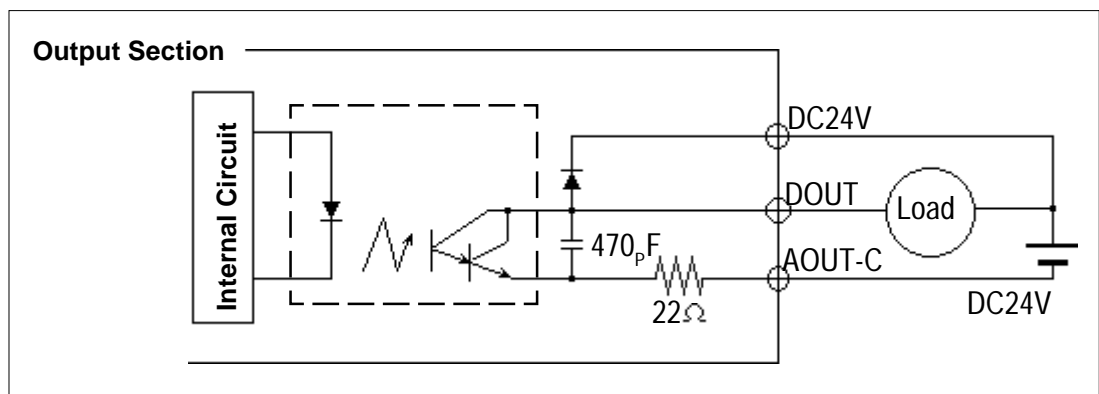
Chapter 2 - Specifications

Input Circuit



Input Voltage	DC 24V +/- 10%	Operating Voltage	ON Voltage min. DC 21.1V OFF Voltage max. DC 3V
Input Current	4mA/DC 24V (TYP)	Termination Type	Photo-Coupler Terminator
Min. Input Pulse Width	2ms		

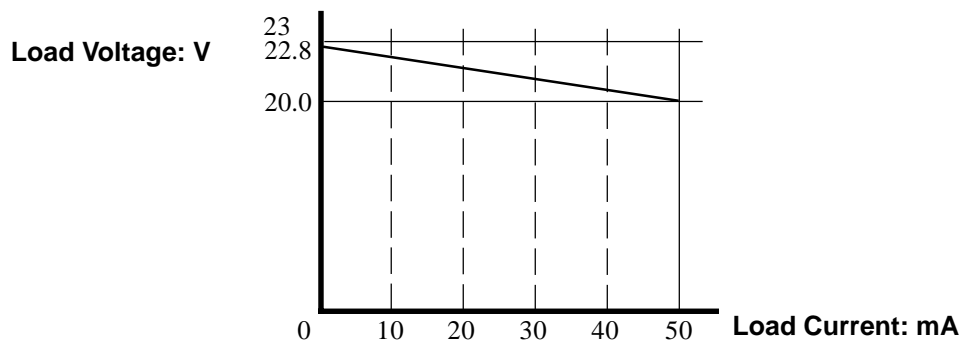
Output Circuit



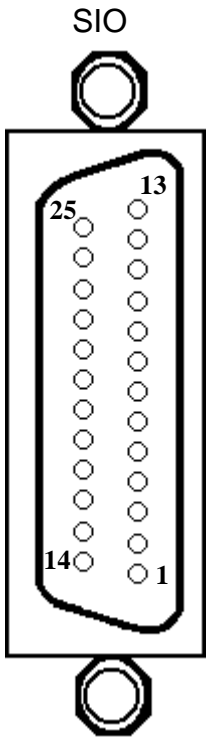
* DOUT = TSW0 to TSW7, RUN, ALARM, BUZZ.

Maximum Load Circuit **50mA / point**
Regulated Load Voltage **DC24V (TYP)**

The relationship between the Load Voltage and the Load Current is as illustrated below:



3. Serial Interface

Pin Connection	Pin #	Signal Name	Condition
	1	FG	Frame ground
	2	SD	Transmit Data (RS-232C)
	3	RD	Receive Data (RS-232C)
	4	RS	Request To Send (RS-232C)
	5	CS	Clear To Send (RS-232C)
	6	NC	Not Connected
	7	SG	Signal Ground
	8	CD	Carrier Detect (RS-232C)
	9	TRMX	Termination (RS-422)
	10	RDA	Receive Data A (RS-422)
	11	SDA	Transmit Data A (RS-422)
	12	NC	Not Connected
	13	NC	Not Connected
	14	VCC	5V±0.5 output 0.25A
	15	SDB	Transmit Data B (RS-422)
	16	RDB	Receive Data B (RS-422)
	17	NC	Not Connected
	18	CSB	Clear To Send B (RS-422)
	19	ERB	Enable To Receive B (RS-422)
	20	ER	Enable To Receive (RS-232C)
	21	CSA	Clear To Send A (RS-422)
	22	ERA	Enable To Receive A (RS-422)
	23	RESERVED	Reserved For Future Use
	24	NC	Not Connected
	25	RESERVED	Reserved For Future Use

Recommended Connector: Dsub25-pin plug XM2A-2501 <made by OMRON Corp.>

Recommended Cover: Dsub25-pin cover XM2S-2511 <made by OMRON Corp.>

Jack Screws XM2Z-0071 <made by OMRON Corp.>



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

Recommended Cable: CO-MA-VV-SB5Px 28AWG <made by HITACHI Cable Ltd.>

To determine your PLC's connection:

Reference *GP-PRO/PBIII for Windows PLC Connection Manual*
(included in the screen editor software package)

When creating your own cable, follow the instructions listed below:

For RS-422 (The following pairs of pin #'s must be connected to each other)

..... #18 (CSB) <—> #19 (ERB)

..... #21 (CSA) <—> #22 (ERA)

- When connecting the RS-422 cable and the #9 (TRMX) and #10 (RDA) points, a termination resistance of 100Ω is added between RDA and RDB.
- When making a cable for the Memory Link format, be sure to select a 4-line System.

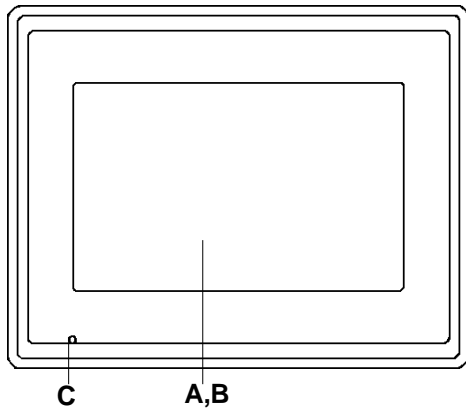
For RS-232C

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



- **Pin 14 (DC 5V Output) is not protected. Be sure to obey all wiring and current regulations when using it.**

2.4 Names and Functions of GLC Parts



A: Display Panel

The GLC monitor screen displays the screen setup and corresponding PLC host data.

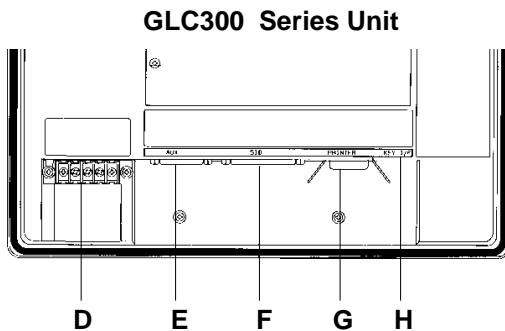
GLC300-TC41-24V
TFT type Color LCD

B: Touch Panel (overlaid on top)

Performs any screen change operations and sends data to the PLC.

C: Status LED

Lights according to operation status.



Color	LED status	Operation Mode	Controller's Mode
Green	Lit	OFFLINE	STOP
	Lit	RUN	RUN
	Blinking	RUN	STOP
Orange	Lit	RUN	Initial Processing
Red	Lit	RUN	Major Error

D: Power Input Terminal Block

The input and ground terminals for the power cable.

E: Auxiliary Input/Output (AUX)

Operates the Touch Switch, System Alarm, Buzzer, and RUN output signals, and Remote Reset input signals.

F: Serial Interface

Used for the RS-232C and RS-422 (Serial) cables. Is connected to the Host (PLC).

G: Printer Interface

The Printer is connected here.

H: Tool Connector

The Data Transfer cable, Bar Code Reader or Memory Loader can be connected here.

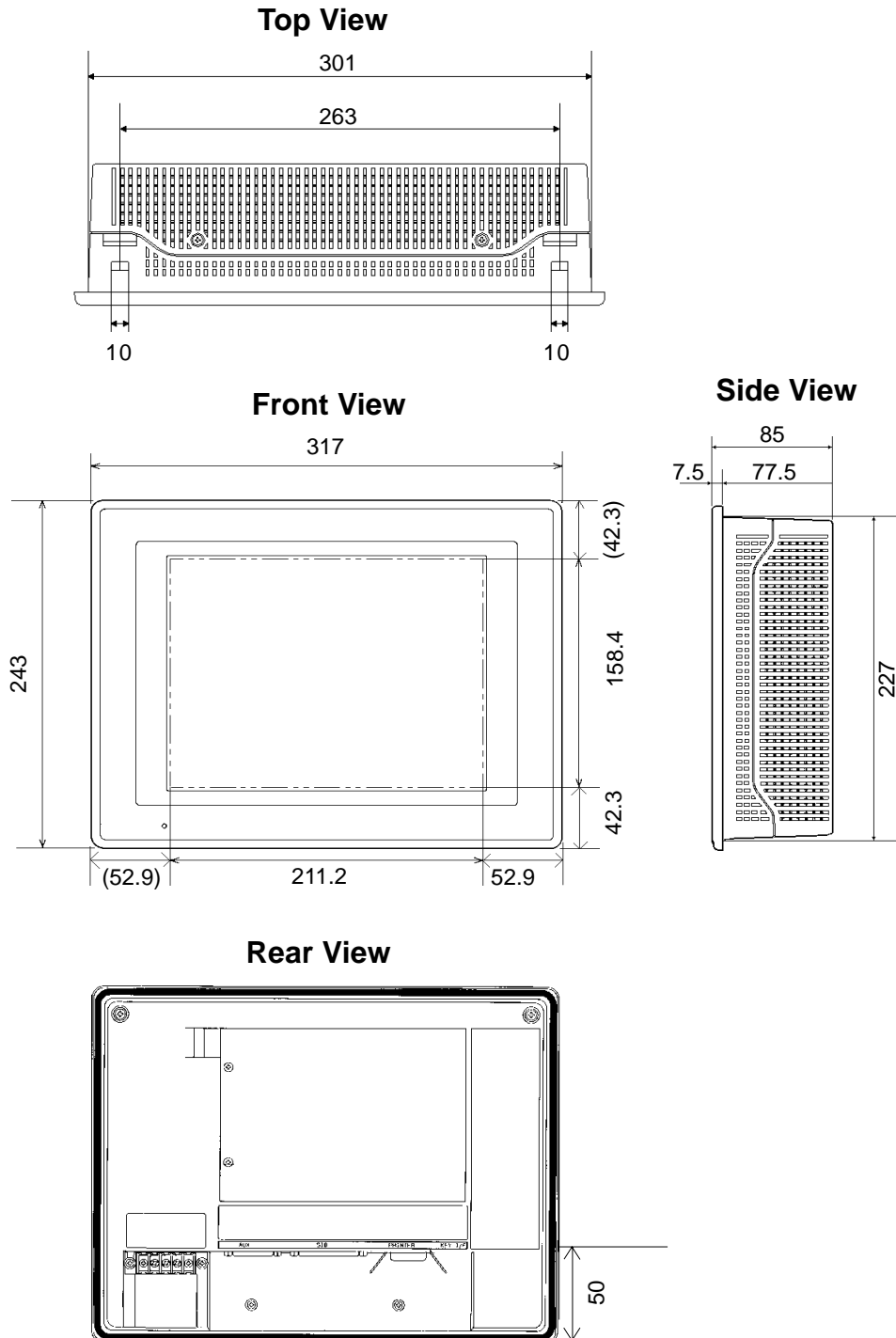
2.5 Graphic Logic Controller Dimensions

1. GLC300 Series - External Dimensions



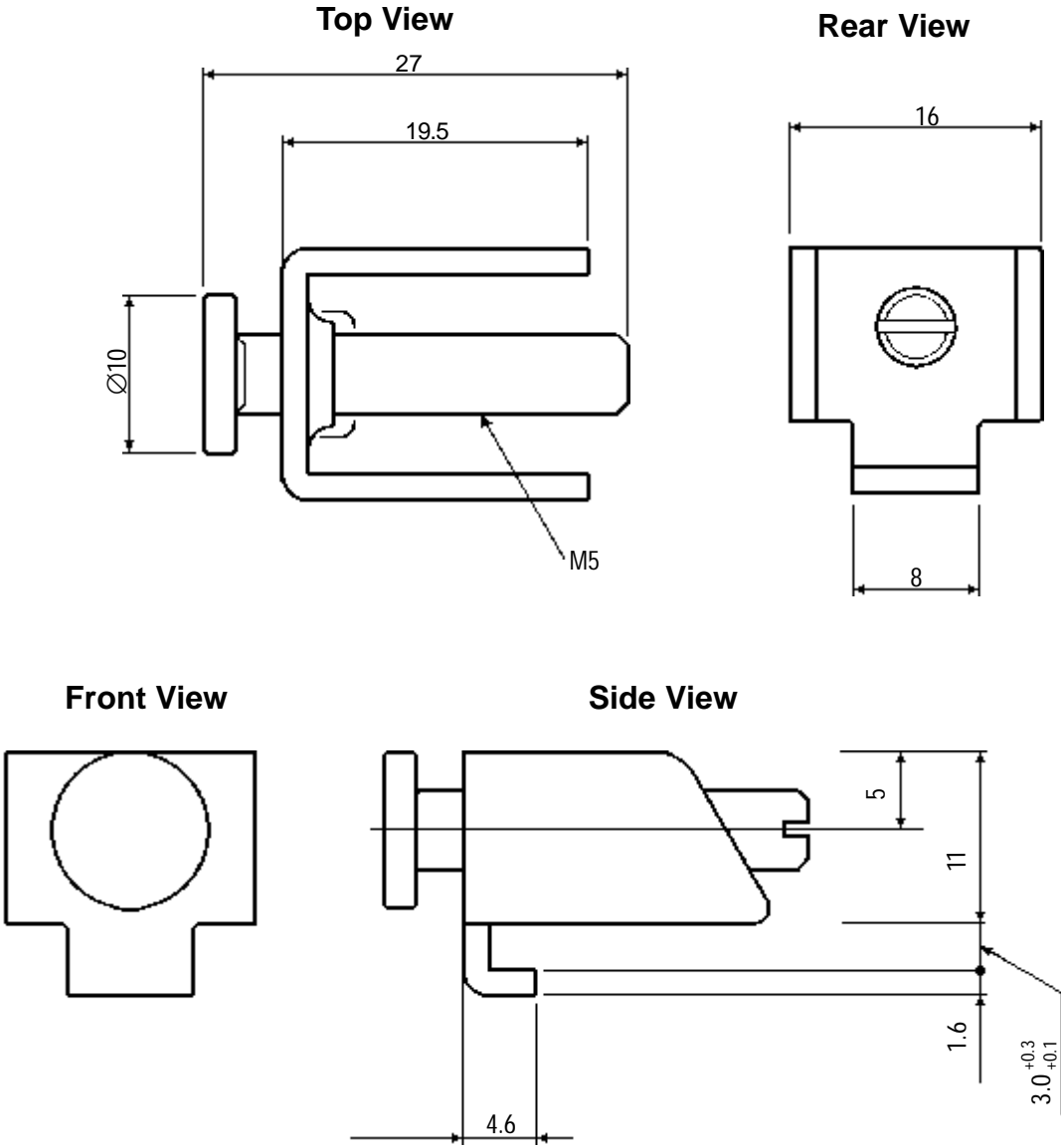
- For detailed dimension information, please contact your local GLC distributor.

Unit: mm



2. Installation Fasteners

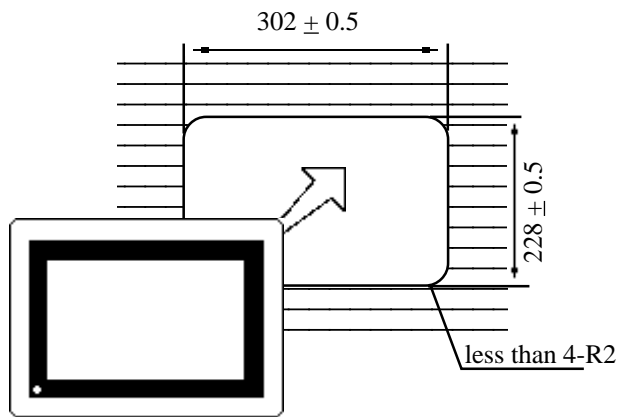
Unit: mm



3. GLC Installation Mounting Hole Dimensions

Unit: mm

■ Installation Mounting Hole



Chapter 3

Installation and Wiring

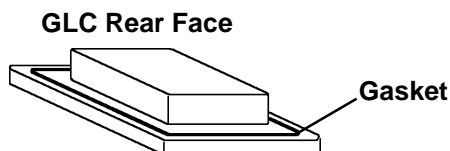
1. Installation
2. Wiring Cautions
3. Installation Precautions
3. Connecting the Printer Cable
4. GLC Tool Connector

3.1 Installation



When installing the GLC panel, be sure to follow the steps listed below

- **Before mounting the GLC into a cabinet or panel, check that the moisture resistant gasket is attached to the unit.**

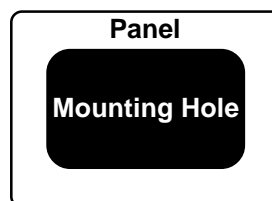


1. Creating an Installation Opening

Create the correct sized opening required to install the GLC, using the installation dimensions given.

Reference 2.5.3 *GLC Installation Mounting Hole Dimensions*

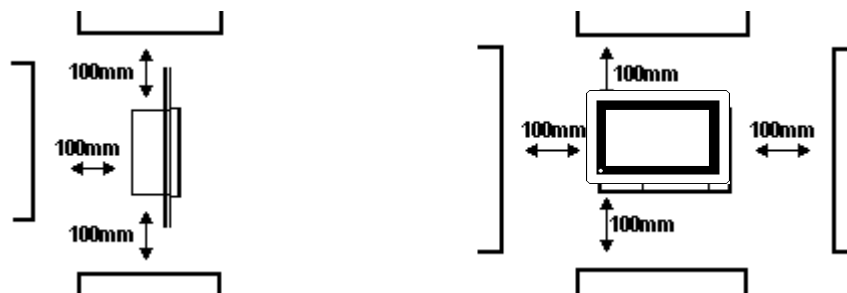
The moisture resistant gasket, installation brackets and attachment screws are all required when installing the GLC.



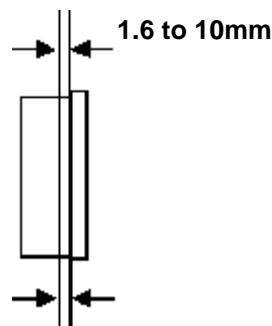
Chapter 3 - Installation and Wiring



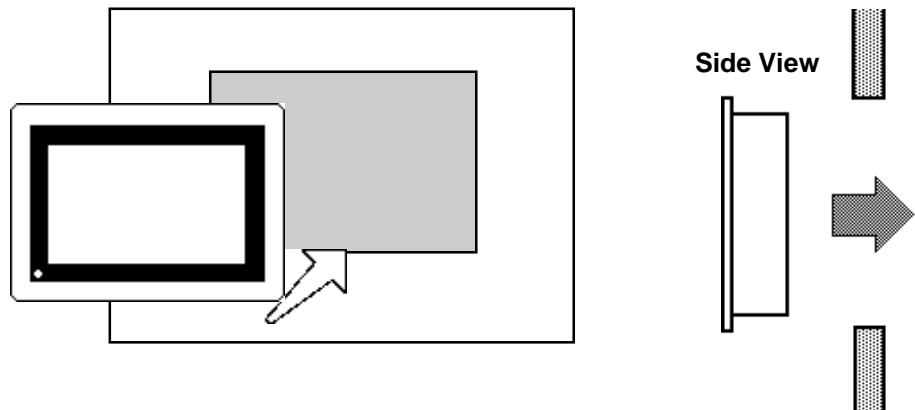
- Be sure that heat from surrounding equipment does not cause the GLC to exceed its standard operating temperature.
- Normally, GLC units should be installed horizontally.
- If the ambient operating temperature exceeds the allowed limit, be sure to use forced air cooling system (i.e. a fan) so that the GLC unit operates within the ambient operating temperature range.
- When installing the GLC vertically, orient the unit so that the Power Terminal Block points upwards.
- For easier maintenance and operation, plus better ventilation, ensure the GLC unit (including I/O units) is mounted at least 100 mm away from adjacent structures and other parts.



- Be sure this unit is located as far away as possible from electromagnetic circuits, non-fuse type breakers, and other equipment that can cause arcing.
- It is important that the panel or cabinet's surface is flat, in good condition, and without any jagged edges for better water-resistance. To prevent the panel or cabinet's surface from bending, reinforcing stays can be attached (welded) to its inner surface.
- Panel thickness should be from 1.6mm to 10.0mm.

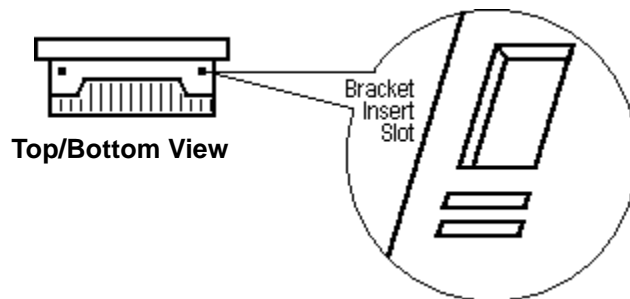


2. Installation Direction



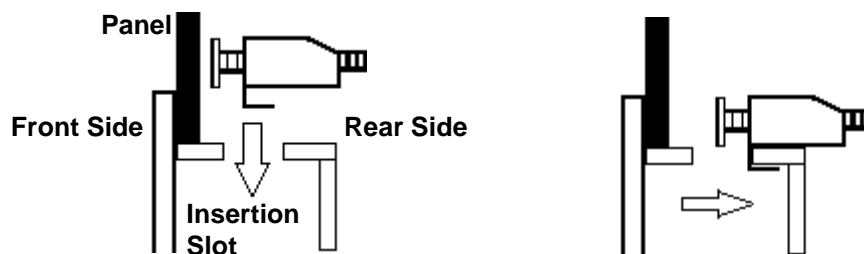
3. Securing the Installation Fasteners

There are four (4) insertion slots on the top and bottom of the GLC, where the metal installation fasteners hook on.



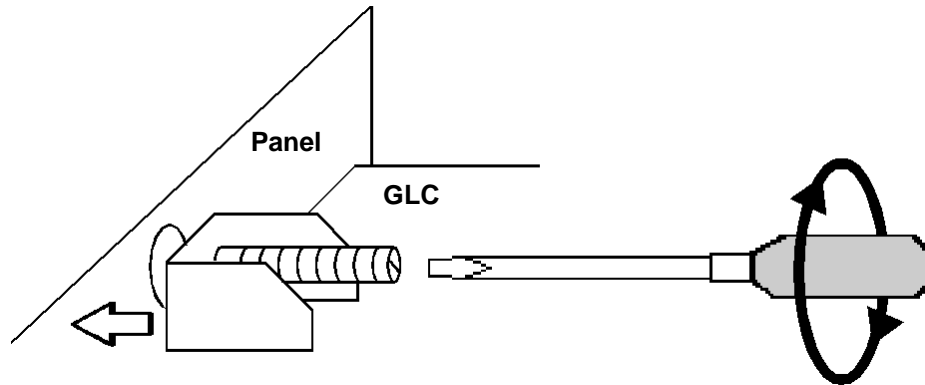
4. Inserting and Tightening the Fasteners

Insert each of the fasteners into its slot as shown below. Be sure to pull the fastener back until it is flush with the rear of the attachment hole.



Chapter 3 - Installation and Wiring

Use a screw driver to tighten the attachment screws and secure the GLC unit in place.



- *A torque of only 0.5 to 0.6 N•m is required to tighten an attachment screw. Be careful not to use too much force, since it may damage the GLC unit.*

3.2 Wiring Cautions

1. Connecting the GLC's Power Cable

WARNING

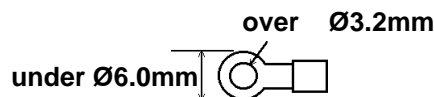
- To avoid electric shocks, be sure the Power Cable is unplugged from the power outlet when connecting the cable to the GLC unit.
- The GLC300-TC41-24V accepts 24 VDC power input only. Using a power supply not made for the GLC or, using a power supply with incorrect polarity will result in damage to both the power supply and the GLC.
- Please connect a breaker unit as a power switch for your GLC.
- When connecting the GLC power cord's power terminals, be sure to ground the FG (⊕) terminal, since there is possibility of an electric shock if the GLC malfunctions.



- *When the FG terminal is connected, be sure the wire is grounded. Not grounding the GLC unit will result in excess noise.*



- Wherever possible, use thick wires (max 2mm²) for power terminals, and twist the exposed wire ends when connecting the Ring Terminals.
- Please use the following sized Ring Terminals.

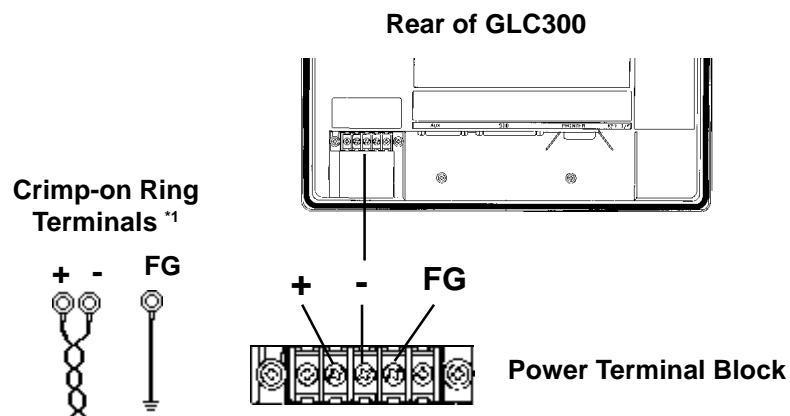


- To prevent the Ring Terminals from causing a short when the terminal block attachment screws are loosened, be sure to use sleeve-type Ring Terminals.
- Do not wire the GLC's power cable either near or parallel to high voltage or high current power lines.

Chapter 3 - Installation and Wiring

To connect the GLC's power cable terminals:

- 1) Confirm that the power cord is unplugged from the power supply.
- 2) Remove the power terminal block's cover using a Phillips screwdriver.
- 3) Remove the power terminal block's central three attachment screws.
After placing the Ring Terminals on the screw holes, reinsert the screws to secure the Ring Terminals in place.
 - Be sure to attach the Ring Terminals in the correct order.
 - Appropriate tightening torque range is 0.5 to 0.6 N·m.
- 4) Reattach the power terminal block's cover using a Phillips screwdriver.

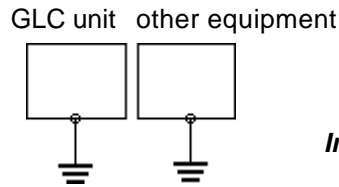


***1** FG = Ground terminal - connected to the GLC chassis

Recommended ring terminal: V2-MS3 or equivalent
(Made by JST Corporation)

2. Grounding the GLC

(a) Exclusive grounding (BEST)

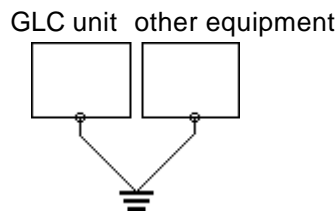


- Connect the FG terminal found at the back of the unit to an exclusive ground. [diagram (a)].

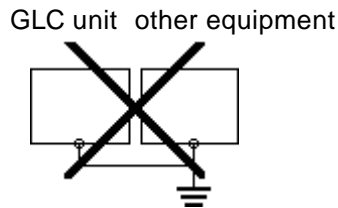
- **Check that the grounding resistance is less than 100Ω .**

- **The grounding wire should have a cross sectional area greater than 2mm^2 . Set the connection point as close to the GLC unit and make the wire as short as possible. When using a long grounding wire, replace the thin wire with a thicker wire placed in a duct.**

(b) Common grounding (OK)



(c) Common grounding (Not OK)



- If exclusive grounding is not possible, use a common connection point. [diagram (b)]

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



- **Do not place power lines over wires used for grounding the GLC, since it can lead to an accident or machine malfunction.**

3. I/O Unit Attachment Precautions

■ I/O Unit Attachment

Prior to attaching the I/O unit to the GLC, first connect the power cable to the GLC and then confirm that the electricity is not turned ON to the GLC unit and I/O cable.

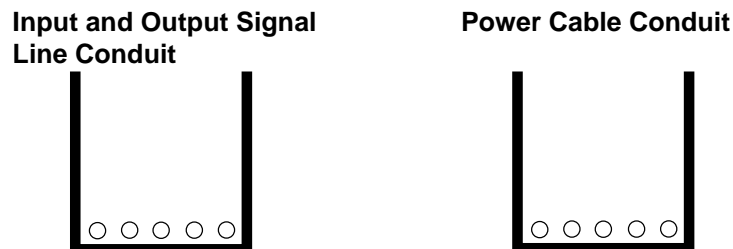
NEVER attach or remove the I/O unit with the electricity turned ON, otherwise it can cause the unit to malfunction or to be damaged.

Reference For the attachment method of the I/O unit to GLC, refer to each I/O unit's User's Manual.

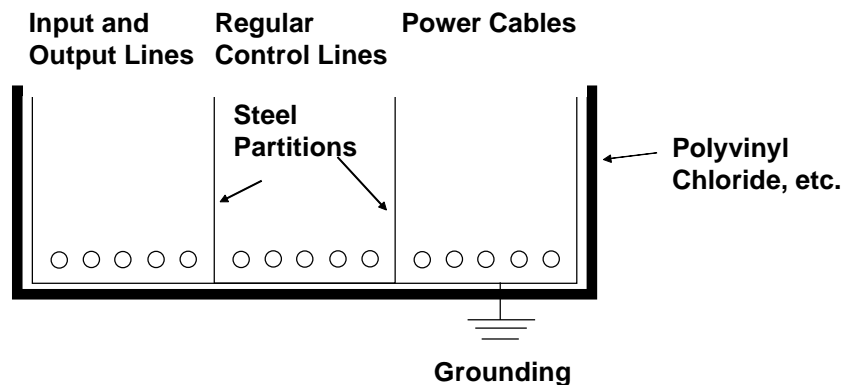
4. Input and Output Signal Line Wiring Precautions

■ Wiring of the Input and Output Signal Lines

Install the input and output signal lines in a separate conduit from that for the power cables. Also, be sure to keep sufficient distance from any power cables so that the signal lines are not influenced by induced noises and power from the power cables.



When these lines and cables need to be installed in the same conduit, be sure to use grounded steel plate partitions to separate them.



- If the power circuit cables cannot be installed separately, use shielded cables and ground the shielded end of them.

3.3 Installation Precautions

When an external power problem occurs or the GLC unit malfunctions, abnormal GLC operation may occur.

In order to prevent these problems from causing a system malfunction, as well as to ensure the system's fail-safe design, be sure to set up all circuits that can cause machine damage or accidents by abnormal operation, such as emergency stop, protection, and interlock circuits, outside the GLC.

The following are system design circuit examples, designed to enhance the system's reliability and provide optimal performance.

■ Electric Circuit's Fail-safe Design

When designing the circuit structure, be sure to consider that an equipment malfunction may occur when the GLC starts up, due to start-up time differences between the control equipment (specifically DC power equipment) connected to the GLC's output unit, the GLC unit, and the GLC's program. When using a remote I/O unit, create a program that checks the terminal's status via a logic program.

For example, first, connect voltage relay coils to the GLC output unit's power circuit and to the control equipment's power circuit. Then, connect their contacts to the GLC's input unit. Be sure to set up the circuit so that the ladder program of any control equipment connected to the GLC output unit is performed only after checking the voltage relay ON signals via the logic program.

■ Power Supply Voltage

The power supply should be in the range of 24 VDC \pm 20%

■ Automatic Power Shut-off

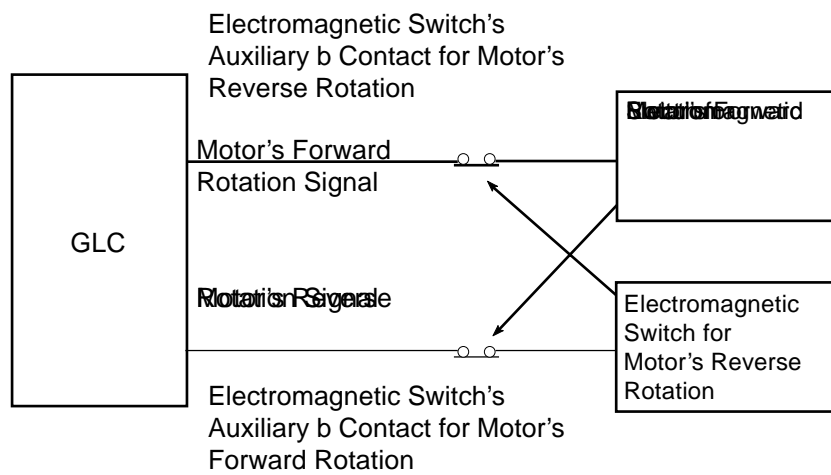
When the power voltage's instantaneous failure continues 20ms or more, the GLC's power is turned OFF.

When this occurs, any arithmetic operation in progress is stopped.

For example, if power is turned OFF while 100 words of data are being transferred by the FMOV command, this data transfer is stopped in the middle.

When designing the program, be sure to consider this function.

Power
AC=>24 VDC



For the GLC, the ON/OFF signals for the Forward and Reverse rotation are provided by the ON/OFF signals for the Forward and Reverse rotation.

The main purpose of the relay is to provide a safe and reliable connection between the control circuit and the power circuit.

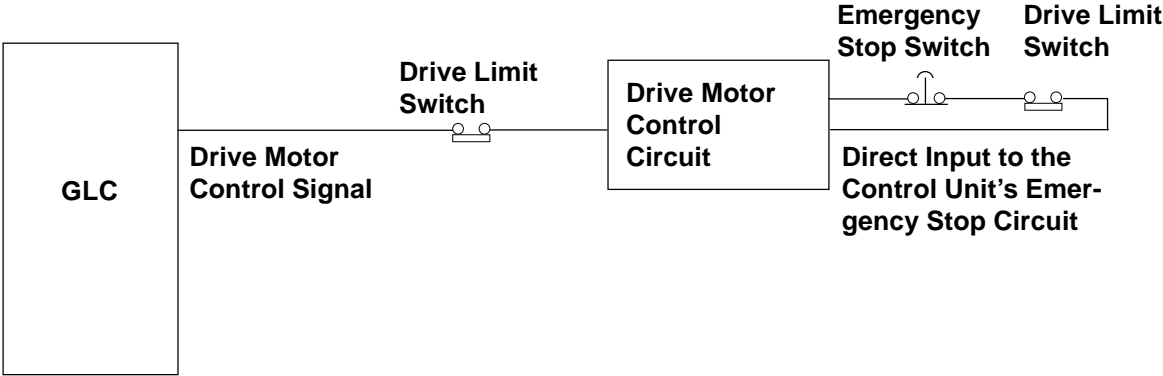
Chapter 3 - Installation and Wiring

■ Interlock Circuit 2

When there is a possibility that an accident can occur due to a GLC malfunction, create a fail-safe design so that the interlock circuit uses external hardware.

In a system where the drive motor must first be stopped when the drive limit switch is actuated, never designate that the limit switch sends input to the GLC, using the GLC's software.

Be sure to design the circuit so that only hardware is used to stop the drive motor, as shown below.

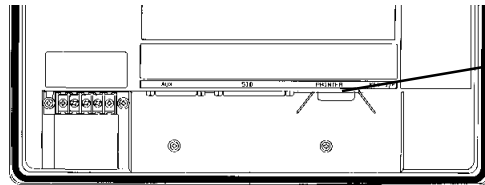


3.4 Connecting the Printer Cable

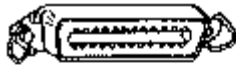
The steps to connect a printer to the GLC are outlined below.

(A 14 pin Centronics printer cable is required)

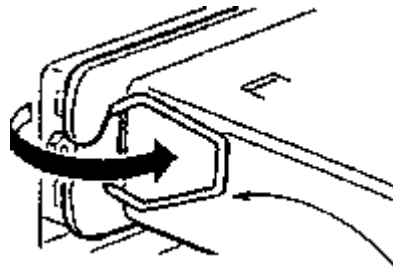
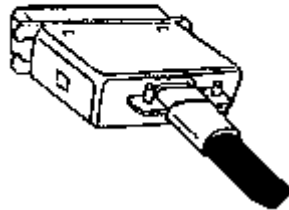
GLC300 Series (rear face)



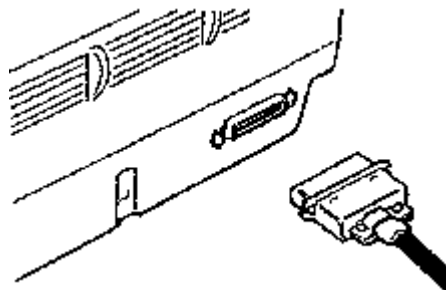
Printer Interface
(Printer Cable Connector)



- 1) Connect the 14 pin end of the cable to the GLC.



- 2) Secure the cable by squeezing the connector's two (2) side pinch-clips until they lock into place.

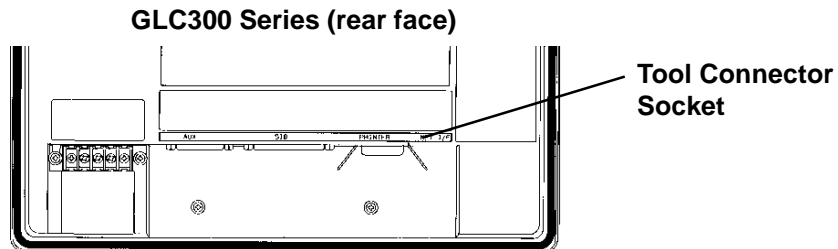


- 3) Connect the cable to your printer, using the same procedures outlined in steps 1 and 2.

(For the correct printer cable to use with this unit, please contact your nearest Digital representative)

3.5 GLC Tool Connector

The GLC's Data Transfer Cable, Memory Loader II, or the Bar Code Reader can be attached to the GLC's Tool Connector socket.



- ***Before unplugging any connector(s) from the back of the GLC, be sure the GLC's power cord is unplugged from the main power supply.***
- ***When the Bar Code Reader uses a separate power supply:***
 - ***Turn the Bar Code Reader ON before turning the GLC ON.***
 - ***Turn the GLC OFF before turning the Bar Code Reader OFF.***



Chapter 4

OFFLINE Mode

1. Entering OFFLINE Mode
2. OFFLINE Mode's Main Menu
3. INITIALIZE—Standard Operation
4. SELF-DIAGNOSIS—Standard Operation
5. Transfer Screen Data/Logic Program

4.1 Entering OFFLINE Mode

OFFLINE Mode provides access to the Initialize, Self-Diagnosis, and other features built into the GLC. You will need to change the GLC to OFFLINE mode before you can use any of these features.

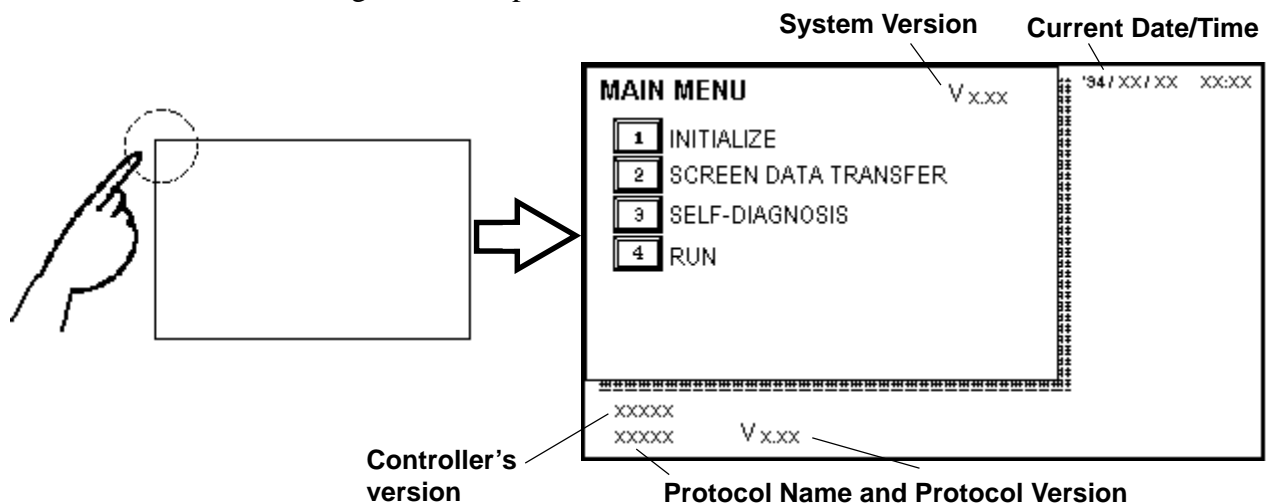


- **OFFLINE mode is unavailable in a completely new GLC until the necessary Screen Data has been transferred from the screen editor software. Be sure the GLC's power cord is plugged in and no images are displayed on the GLC screen. When data is transferred from your PC to the GLC, the necessary System Data will be sent.**

To INITIALIZE the setup or run SELF-DIAGNOSIS in the GLC unit, entering the OFFLINE mode becomes necessary. There are two ways to enter OFFLINE mode; first, immediately after plugging in the GLC's power cord, and second, by using the Force Reset feature.

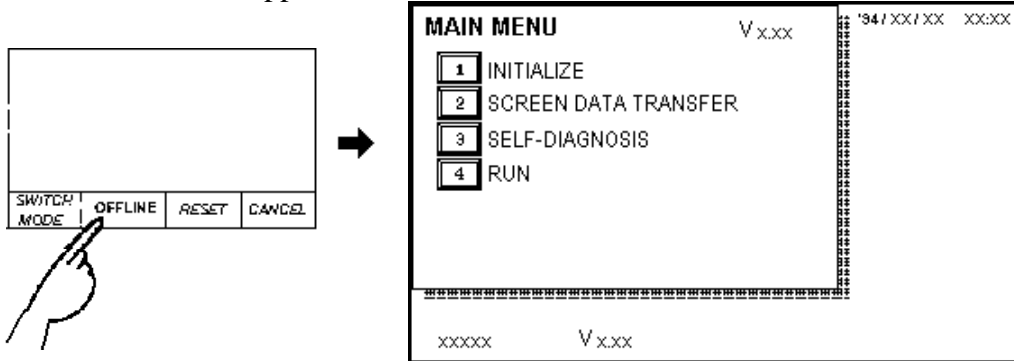
1. When Turning the GLC's Power ON

Touch the upper left-hand corner of the GLC screen within 10 seconds of turning the GLC's power ON.



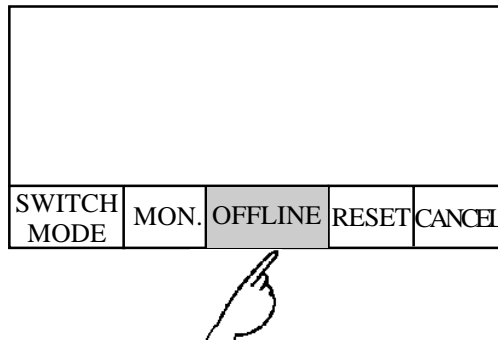
2. From Force Reset

From the Force Reset screen, touch the OFFLINE button and the Main Menu will appear.*1



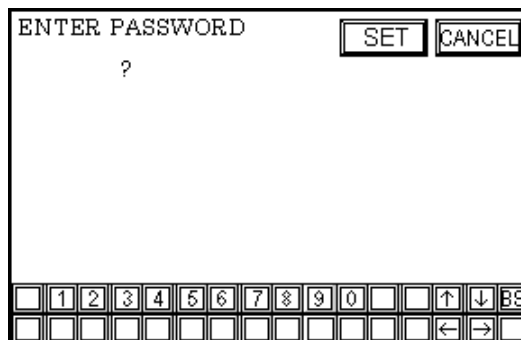
Note: • When the GLC unit has the Device Monitor function, the following display will appear.

Reference *GP-PRO/PB III for Windows PLC Connection Manual, Appendix 3 - Device Monitor*



If a Password has been set in INITIALIZE/ SET UP SYSTEM, before entering the OFFLINE mode, the following screen appears. Enter the password, then touch *Set* to enter OFFLINE mode.

Reference *For more information about Passwords, refer to 5.3 SYSTEM ENVIRONMENT SETUP and 4.3, ■ Entering Numbers.*

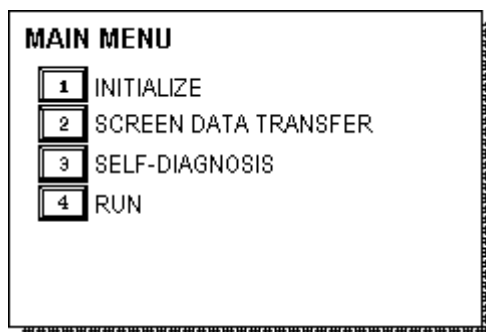


*1 **Reference** *For instructions on how to enter the Forced Reset Screen, refer to 5.4.3 Set Up Touch Panel; FORCE RESET*

4.2 OFFLINE Mode's Main Menu

Each menu item shown below has different settings that must be set to match the corresponding PLC in order for the GLC to communicate properly.

Entering OFFLINE mode calls up the following screen.



Select the desired menu item by touching the corresponding number on the screen.

Each Main Menu item is used as follows.

INITIALIZE

The setup items listed in this menu are necessary to run the GLC unit.

SCREEN DATA TRANSFER


Select to transfer screen data edited by the screen editing software from personal computer to GLC.

SELF-DIAGNOSIS

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

RUN

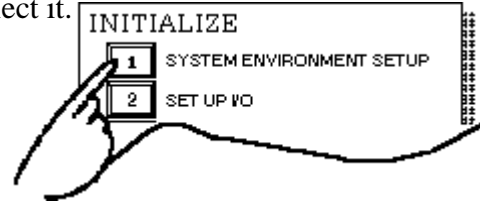
Starts GLC operation.

Reference  For more information about INITIALIZE, refer to **Chapter 5, Initializing the GLC**; for more information about TRANSFER SCREEN DATA, refer to **the GP-PRO/PB III for Windows Operation Manual (included in the screen editor software package)**; for more information about SELF-DIAGNOSIS and RUN, refer to **Chapter 6, GLC Run Mode and Errors**.

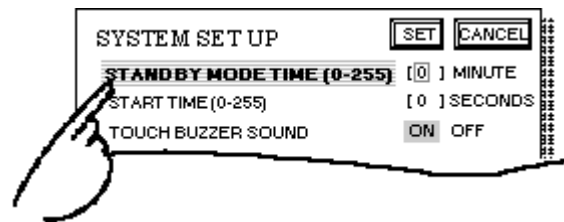
4.3 INITIALIZE—Standard Operation

■ Selecting A Menu

- Touch the menu number to select it.

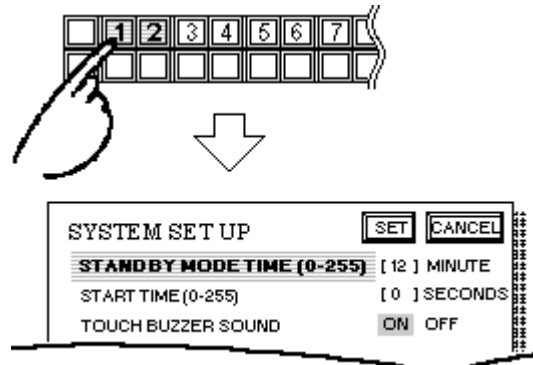


- Select an item to be set up or touch the input area.



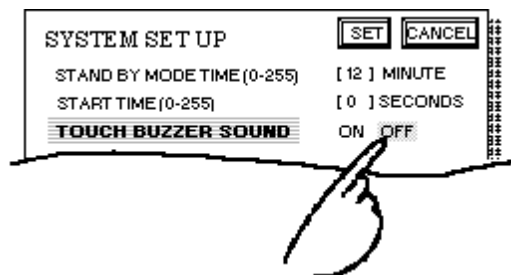
■ Entering Numbers

- After selecting an input field by touching it, use the numeric touch keys located at the bottom of the screen to enter numeric values. After entering data, touch the [SET] key to register it.



■ Selecting Setup Conditions

- When selecting a menu, its options appears. Every time the input area is touched, the option is highlighted and selected. Select the desired option (condition) to be set up.

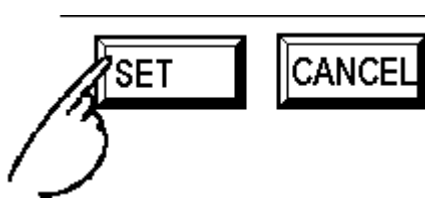


Chapter 4 - OFFLINE Mode

■ After All Setting Data is Entered

Touch the top-right button, titled "SET".

If you wish to exit the screen without saving the changes, touch the CANCEL button.

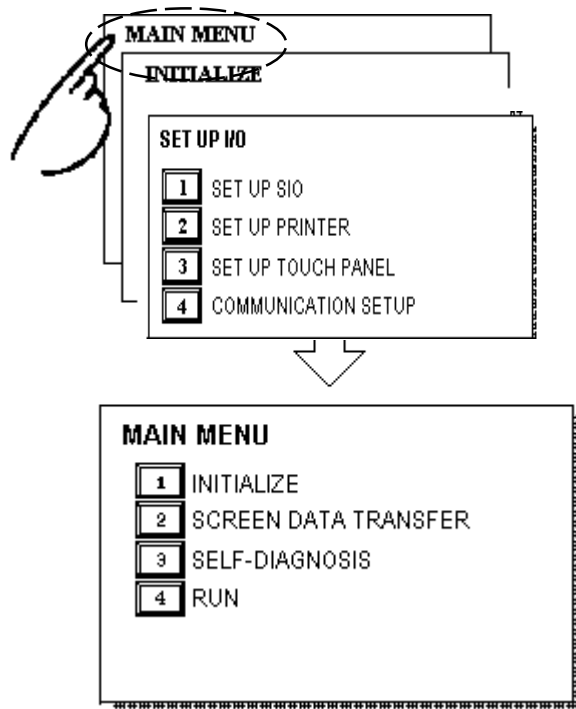


- Touch the SET key to write the Setup conditions onto the Internal FEPR0M, which may take some time, causing a delay in returning to the previous screen. Therefore, do not touch the screen until the previous menu display returns.
- Touch the CANCEL key *not to write* the Setup conditions onto the Internal FEPR0M and return to the previous menu.

■ Return To Previous Screen

Touch the title of the screen you would like to return to.

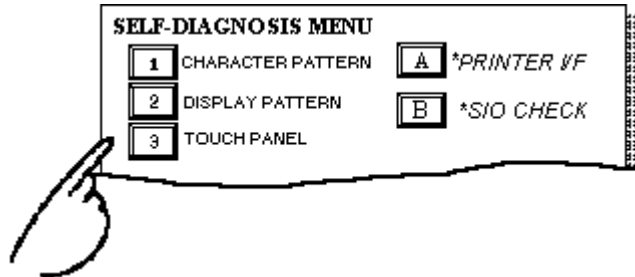
E.g. To return to the MAIN MENU from the SET UP I/O screen, simply touch the MAIN MENU title.



4.4 SELF-DIAGNOSIS—Standard Operation

■ Selecting a Menu

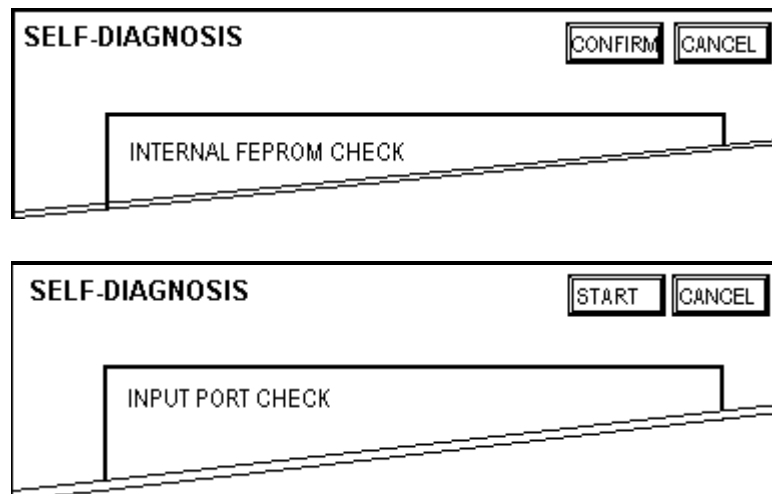
Touch the desired menu item and that sub-display will appear.



■ CONFIRM, START, CANCEL Keys

After selecting the Self Diagnosis item, the CONFIRM, START, and CANCEL keys will appear at different times at the top of the screen.

E.g.



CONFIRM Key

When you see this key, certain preparations—displayed in a message box in the center of the screen—must be made before the Self-Diagnosis can begin. This key ensures you have made these preparations. Only touch CONFIRM when you are sure you have accomplished the desired tasks.

START Key

When this key is touched, your selected Self-Diagnosis test begins.

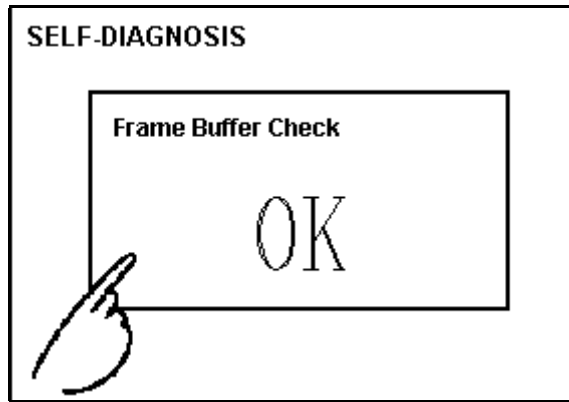
CANCEL Key

When this key is touched, the selected Self-Diagnosis test is cancelled, and you are returned to the SELF-DIAGNOSIS menu.

Chapter 4 - OFFLINE Mode

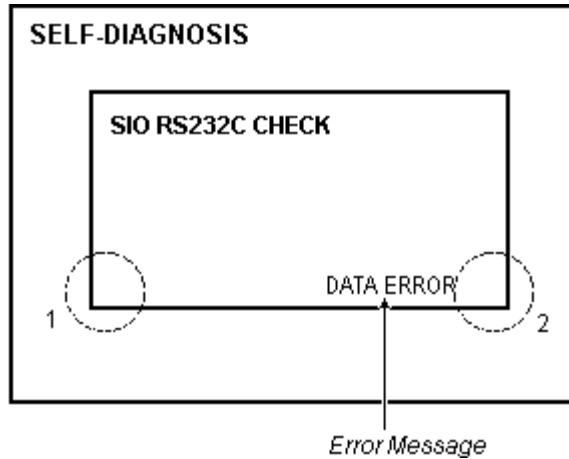
■ After Check—To Return To SELF-DIAGNOSIS MENU

When OK displays,



Touching once anywhere on the display screen returns you to the SELF-DIAGNOSIS MENU.

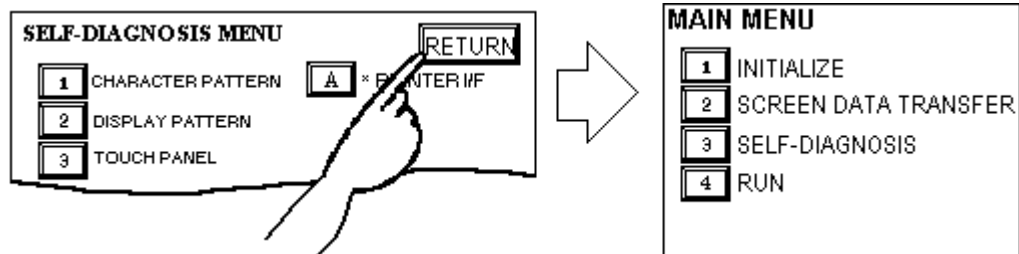
When an Error Message displays



After an error message is displayed, in order to return to the self-diagnosis menu screen, touch (1) located on the currently displayed screen's lower left corner and (2) located on the lower right corner simultaneously.

■ Return To Main Menu

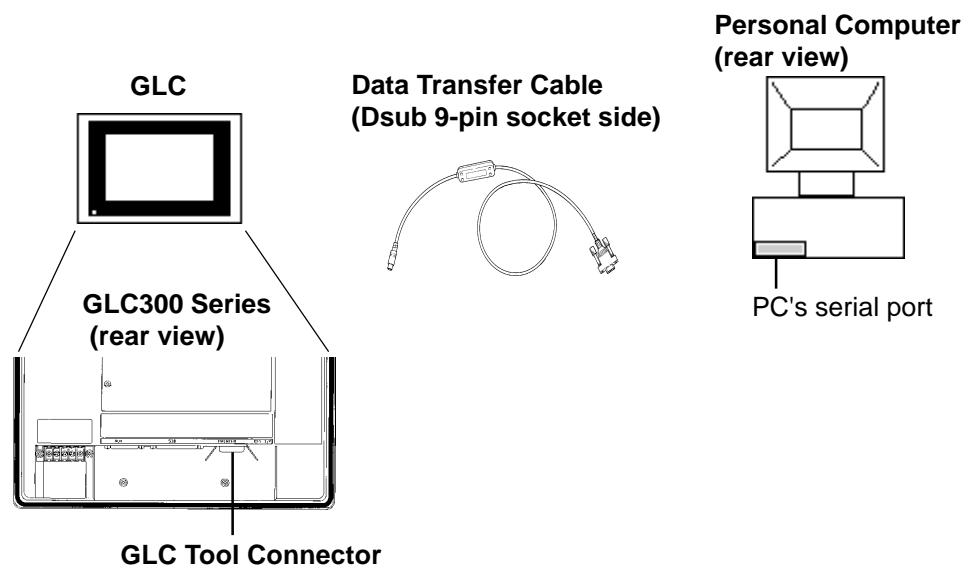
Touch the RETURN Key in the top right corner of the SELF-DIAGNOSIS menu to return to the MAIN MENU.



4.5 Transferring Screen Data/Logic Program

Here, how to transfer or receive data, which has been created using the screen editor software or Pro-Control Editor software, to or from the GLC unit is explained. Prior to transferring or receiving data, connect the GLC to the personal computer via the data transfer cable.

Connect the Data Transfer cable to the GLC's tool connector, located at the back of the GLC, and to your personal computer's serial port.



- When sending data to the GLC, the separately sold data transfer cable (GPW-CB02*1) is needed. I/F converting adaptor for PC is not attached to the cable. Please prepare a connector converting cable applicable to your PC. Connector converting cables are available in general computer stores.
- When using a serial mouse, use a different serial port for the data transfer cable.

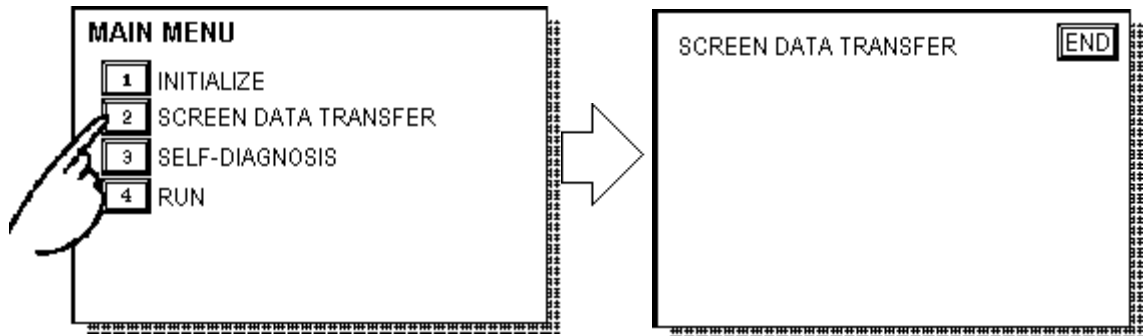
■ Transferring Screen Data

Prior to transferring data, turn the GLC's power ON. Then, set the GLC to the SCREEN DATA TRANSFER mode or RUN mode. Please note that the OFFLINE mode is not available with a brand-new GLC unit. The OFFLINE mode (Initial setting screen) is available only after the screen editor software's system program is transferred to the GLC unit.

Reference *GP-PRO/PB III for Windows Operation Manual*

*1 GPW-CB-SET can also be used.

Chapter 4 - OFFLINE Mode




During data transfer, messages “SETUP Transfer” and “Transfer is in progress. Please wait.” are displayed.

After the data transfer is completed, if the GLC has been set up*¹, the OFFLINE mode’s main menu will be displayed. If the GLC has not been set up, the screen specified in the INITIALIZE area’s SET UP SCREEN will be displayed and the GLC enters the RUN mode.

■ Program Transfer

First, set the GLC’s operation mode to “RUN.” Transfer the logic program to the GLC via the Pro-Control Editor.

Reference  *Pro-Control Editor Operation Manual (included in the Pro-Control Editor software package)*

*¹ Setup means to download the GLC’s system program and a PLC protocol driver from the screen editor software, in order to run the GLC in a desired environment. This is automatically performed by the screen editor software according the conditions.



Chapter 5

Initializing the GLC

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

5.1 Initialization Screen

Occasionally, you may want to change one or more of the GLC unit's general operation settings. These settings are listed under the INITIALIZE option in the GLC's MAIN MENU.

This chapter explains each of the OFFLINE mode's INITIALIZE items. However, there are 2 types of INITIALIZE settings, those for the **1:1** connection and those for the **n:1** (multi-link) connection*¹.

- 1:1** Processing where a single (1) GLC is connected with a single (1) PLC.
- n:1** Processing where multiple GLC's are connected with a single PLC. The GLCs successively pass a *PLC Access Token* (exclusive PLC interaction key) among themselves to designate which will communicate with the PLC.



- **If you transfer your screen design software's System file*², the GLC operates using that data. If the GLC System file has been correctly setup and transferred, the INITIALIZE settings become unnecessary.**

Reference *For more information about GLC System files, refer to the GP-PRO/PBIII for Windows Operation Manual.*

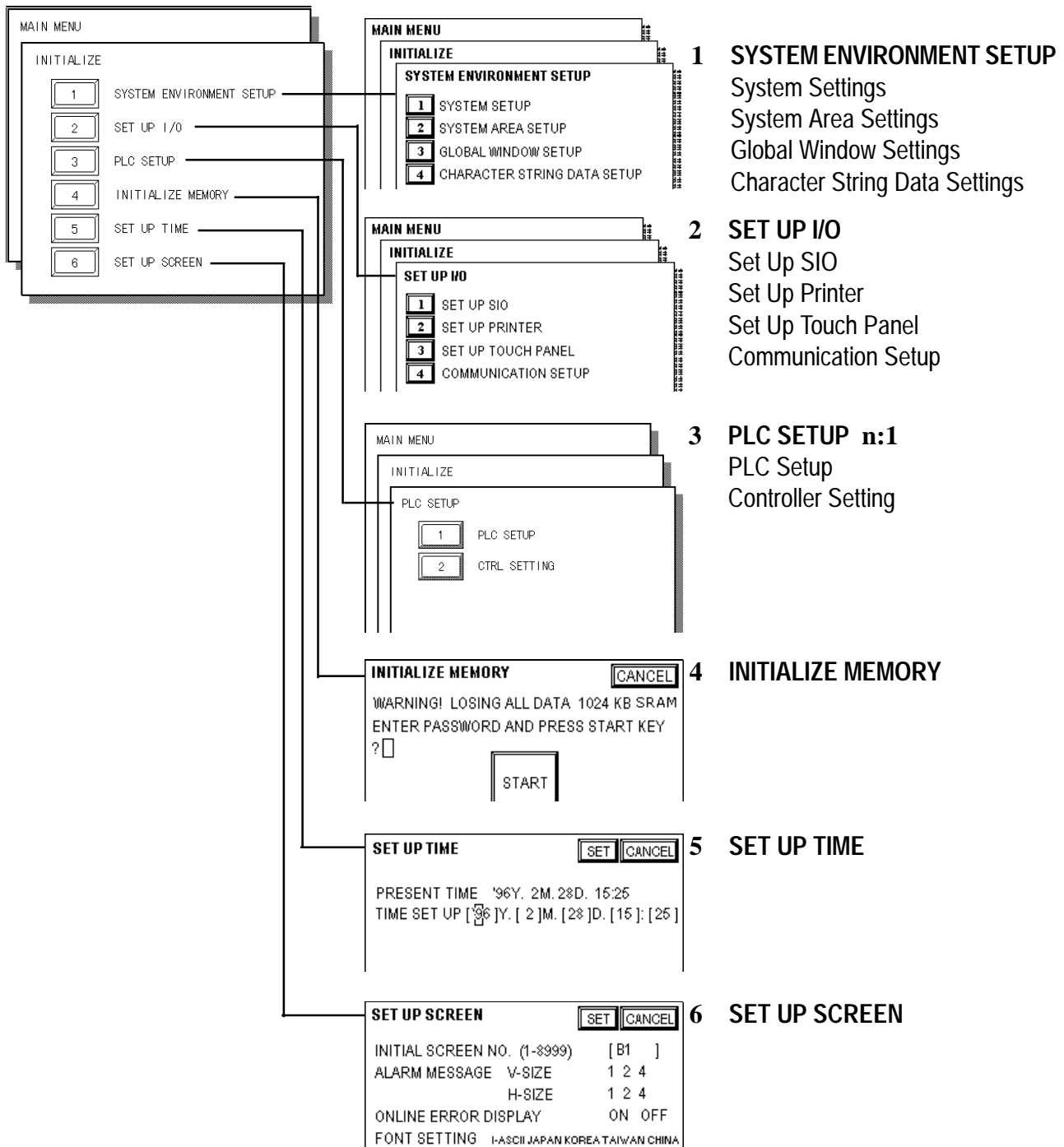
*¹ Some PLC's do not support n:1 (multi-link) connection.

*² This indicates SO file.

5.2 Initialization Items

The contents of the Initialize setup items listed below are explained in this chapter.

Reference To learn about screen operations and numeric input, refer to Chapter 4, OFFLINE Mode.



5.3 SYSTEM ENVIRONMENT SETUP

GLC environment adjustments are made here. The SYSTEM ENVIRONMENT SETUP includes the SYSTEM SETUP, SYSTEM DATA AREA, GLOBAL WINDOW SETUP, and CHARACTER STRING DATA SETUP.

1. SYSTEM SETUP

SYSTEM SETUP		SET	CANCEL
STAND BY MODE TIME (0-255)	[0]	MINUTE	
START TIME (0-255)	[0]	SECOND	
TOUCH BUZZER SOUND	ON	OFF	
BUZZER TERMINAL OUTPUT	ON	OFF	
PASSWORD SET UP (0-9999)	[0]		
DATA TYPE OF SCREEN NO.	BIN	BCD	

STANDBY MODE TIME (0-255)

To protect the GLC display screen, the GLC is equipped with a screen saver function that automatically erases the screen when no GLC operations have occurred for a period of time. A "0" entered in this field causes a normal display, i.e. the screen is cleared after the GLC's standard default time elapses.

When SYSTEM DATA AREA's (**Reference** *PLC Connection Manual*) SCREEN DISPLAY OFF*¹ data is **0000H**, and the following operations are *not* performed on the screen for the User's designated period of time, the GLC's current display data is cleared.*²

- Change Screen
- Touch Screen
- Alarm Display

START TIME (0-255)

This setup determines the start-up time of the GLC. Use this setup to adjust the power up sequence so that the GLC starts up after the PLC.

TOUCH BUZZER SOUND

Setup whether or not the GLC beeps when pressed.

BUZZER TERMINAL OUTPUT

Setup whether or not the *BUZZ* signal is output from GLC's AUX I/F. This option is for an external buzzer.

*¹ When using the Direct Access or the Memory Link formats, the object address becomes +9 or +12, respectively.

*² When the GLC is in OFFLINE mode, this feature is not enabled.

PASSWORD SETUP (0-9999)

The password setting is used when changing to the Initialize Memory or Initialize (OFFLINE mode) Screens. The password (*number*) ensures protection of the GLC settings as OFFLINE mode will not be entered inadvertently. Enter the optional number of your choice. If you do not wish to use this setup, enter the default **0**.

DATA TYPE OF SCREEN NO.

This setup controls whether BIN or BCD format numbers are used when making screen changes. Screen numbers 1~8999 are available when set up in binary format; screen numbers 1~1999 are available when set up in BCD format.

2. SYSTEM AREA SETUP

SYSTEM AREA SETUP is necessary for the PLC to administer the GLC, and prepare the PLC internal Data Memory (DM) and Data Register (D)*1. Use this setup to prepare the desired SYSTEM DATA AREA items. When using the Memory Link format, this setting is unnecessary.

Touch the item number, and when the item is highlighted, it has been selected.

SYSTEM AREA SETUP		CONFIRM	CANCEL
1	CURRENT SCREEN NO. (1 WORD)	8	CLOCK DATA (SET) (4 WORDS)
2	ERROR STATUS (1 WORD)	9	CONTROL (1 WORD)
3	CLOCK DATA (CURRENT) (4 WORDS)	A	RESERVED (1 WORD)
4	STATUS (1 WORD)	B	WINDOW CONTROL (1 WORD)
5	RESERVED (1 WORD)	C	WINDOW REG. NO. (1 WORD)
6	CHANGE SCREEN NO. (1 WORD)	D	WINDOW LOCATION (2 WORDS)
7	DISPLAY ON/OFF (1 WORD)	SYSTEM AREA SIZE: WORD(S)	

(Item numbers displayed in reverse mode are selected.)

System Area Size

This field displays the total number of words used for the items selected from the SYSTEM AREA SETUP (**Write** and **Read**).

When you touch the Confirm key, the SYSTEM AREA CONTENTS screen appears to confirm the selected items



- **The setup shown is enabled only when using the Direct Access format.**
- **The selected System Area items, as displayed on the screen, become the System Data Area.**

When these five items, "Current Screen Number", "Error Status", "Clock Data (Current)", "Change Screen Number", and "Display ON/Off", have been selected, word addresses are assigned to each item, in order, as shown on the next page.

*1 Data Memory (DM) refers to the OMRON PLC ; Data Register (D) refers to the Mitsubishi Electric PLC.

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SYSTEM AREA CONTENTS	WORD	BYTE	SET	CANCEL
	+0	+0, 1		
	+1	+2, 3		
	+2	+4, 5		
	+3	+6, 7		
	+4	+8, 9		
	+5	+10, 11		
	+6	+12, 13		
	+7	+14, 15		
	+8	+16, 17		
	+9	+18, 19		
	+10	+20, 21		
	+11	+22, 23		
	+12	+24, 25		
	+13	+26, 27		
	+14	+28, 29		
	+15	+30, 31		
	+16	+32, 33		
	+17	+34, 35		
	+18	+36, 37		
	+19	+38, 39		



Addresses LS16 to LS19 are fixed since they control the Global Window. These addresses cannot be used for any other purpose.

The System DataArea selection process follows this formula [System Data Start Address + n]. For example, if the System Area Start Address was D00200, and the *Change Screen Number* option had been selected—if you refer to the System Area Contents screen displayed above—because *Change Screen Number's* address is pegged at +6, its word address would be $D00200+6=D00206$ and be assigned to D00206.

Reference For more information on LS Areas 16 to 19, refer to the *GP-PRO/PBIII PLC Connection Manual* (included in the screen editor software package).

3. GLOBAL WINDOW SETUP

The GLC unit can display one *Global Window* and two *Local Windows* at any one time. The Global Window is common to all the display screens. The Local Window displays exclusively on the corresponding base screen. The GLOBAL WINDOW SETUP is described here.

GLOBAL WINDOW

There are two options here: **Use** and **Do Not Use**. Selecting **Use** makes the following options available.

GLOBAL WINDOW SETUP		SET	CANCEL																										
GLOBAL WINDOW	USE	DO NOT USE																											
GLOBAL WINDOW ACCESS	DIRECT	INDIRECT																											
DATA FORMAT	BIN	BOD																											
REGISTRATION NO. (1-256)	[]	[] (DIRECT MODE ONLY)																											
WINDOW LOCATION X POSITION (0-)	[]	[] (DIRECT MODE ONLY)																											
Y POSITION (0-)	[]	[] (DIRECT MODE ONLY)																											
The items in this area are only valid when using the Global Window.																													
<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>0</td><td>↑</td><td>↓</td><td>BS</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>←</td><td>→</td><td></td> </tr> </table>				1	2	3	4	5	6	7	8	9	0	↑	↓	BS											←	→	
1	2	3	4	5	6	7	8	9	0	↑	↓	BS																	
										←	→																		

GLOBAL ACCESS WINDOW

Setup the Global REGISTRATION NO. and the WINDOW LOCATION as *Direct* or *Indirect* values. When set as *Direct*, the REGISTRATION NO. and WINDOW LOCATION selections are fixed to the values setup here. When set to *Indirect*, the WINDOW REG. NO. word address, as prepared in the System Area, is variable—which means it can have the REGISTRATION NO. *written* to it—and as a result, multiple window screens can be used as Global

windows. Using this same method, adjust the Global window position, by writing the X,Y coordinates to the SYSTEM AREA's WINDOW LOCATION word addresses.

DATA FORMAT

Setup whether the REGISTRATION NO. and the WINDOW LOCATION values are inputted as BIN or BCD numbers. This field affects only direct values.

REGISTRATION NO. (1-256)

Setup the Window Screen Number used by the Global Window. This field is applicable only when the GLOBAL WINDOW ACCESS is set to Indirect.

WINDOW LOCATION

Setup for the Global WINDOW LOCATION. This field is applicable only when the GLOBAL WINDOW ACCESS is set to Indirect.

4. CHARACTER STRING DATA SETUP

Character String Data ordering varies from manufacturer to manufacturer. Setup the Character String Data order here to match the corresponding PLC.



- **Setup the CHARACTER STRING DATA MODE to match the PLC type. Device type and Tag settings are unavailable.**

Find the data storage order for your PLC in the table, next page, and setup the CHARACTER STRING DATA MODE.

- (I) Data Device Storage Order
- (II) Internal Word Byte LH/HL Storage Order
- (III) Internal Double-word Word LH/HL Storage Order

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CHARACTER STRING DATA MODE List

I) Data Device Storage Order	II) Internal Word, Byte LH/HL Storage Order	III) Double-word Internal Word LH/HL Storage Order	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

E.g. 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) Word Byte LH/HL Order

E.g. 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
---	---	---	---	------

5.4 SET UP I/O

This section describes the communication setup with the host PLC and the setup for any peripheral equipment. The SET UP I/O menu includes the SET UP SIO, SET UP PRINTER, SET UP TOUCH PANEL, and COMMUNICATION SETUP menus.

1. SET UP SIO

This menu runs the settings related to PLC communication. Be sure to match the settings listed below with the SIO setup on the PLC host.

Reference *GP-PRO/PB III for Windows PLC Connection Manual - Environment Setup*

The screenshot shows the 'SET UP SIO' dialog box with the following settings:

- COMMUNICATION RATE: 19200 (selected)
- DATA LENGTH: 8
- STOP BIT: 2
- PARITY: EVEN
- CONTROL: X-CNTRL
- COMMUNICATION FORMAT: RS232C

Buttons for SET and CANCEL are visible in the top right. A numeric keypad and arrow keys are at the bottom.

COMMUNICATION RATE

The COMMUNICATION RATE (baud rate) is the data communication speed, measured in bits per second (bps), between the GLC and PLC. Match the COMMUNICATION RATE values in both the PLC and GLC. Depending on the rate selected, certain PLCs may not be able to be used.

Reference *GP-PRO/PB III for Windows PLC Connection Manual*

DATA LENGTH

For data communications, the DATA LENGTH must be set up as 7-bit or 8-bit data.

STOP BIT

Set up the STOP BIT as either a 1-bit or 2-bit value.

PARITY

Set up whether no parity check, or an odd or even number parity check will take place during communication.

CONTROL

Data flow CONTROL prevents the overflow of data sent back and forth. Select either X-CNTRL or ER-CNTRL.

COMMUNICATION FORMAT

Select one of the following options for the communication format: RS-232C, RS-422 (4 lines), or RS-422 (2 lines).



- **When using an RS422 cable and the Memory Link format, be sure to select the 4-line option.**

Reference GP-PRO/PB III for Windows PLC Connection Manual

2. SET UP PRINTER

GLC300 Series

PRINTER TYPE

Setup up the type of printer used with the GLC unit.

Use either EPSON option for 24 dot printers, and the HP-LaserJet Series option for PCL4 compatible printers.

PRINT

Designates whether the printer prints in Gray scale or Color.

With Gray-scale selected, the printout of Blue and Green, Cyan and Red, and Purple and Yellow will appear with the same pattern.



- **The HP-LaserJet Series does not support GLC color printouts. Always setup as GRAY SCALING.**
- **Choosing Gray-Scale will reduce the 64 colors to simplified grays. This will effectively eliminate pale or pastel colors.**

BLACK/WHITE REVERSE

This setup reverses the screen colors from white on black (Fg/Bg) to black on white for screen printouts. The screen background on the GLC is black, but it is easier to see screen objects on the hardcopy when *Reverse* is ON so the screen prints white.

E.g. When the GLC screen background is black and the foreground is white, the printout appears as follows.



Print w/ Reverse ON



Print w/ Reverse OFF



- **The previous setup is only for printing a hard copy of the screen image. When an Alarm report is printed, no matter what this setting is, it will print as if REVERSE is ON.**

3. SET UP TOUCH PANEL

Touch operation and Force Reset setup, and Display Device adjustments are made here.

SET UP TOUCH PANEL				SET	CANCEL
TOUCH OPERATION MODE	ONE POINT	TWO POINTS	NO SLIDE		
FORCE RESET	ON	OFF			
CONTRAST ADJUSTMENT	ON	OFF			
BRIGHTNESS ADJUSTMENT	ON	OFF			
<small>(Contrast and brightness settings are not applicable for some display devices.)</small>					
	1	2	3	4	5
	6	7	8	9	0
					BS

TOUCH OPERATION MODE

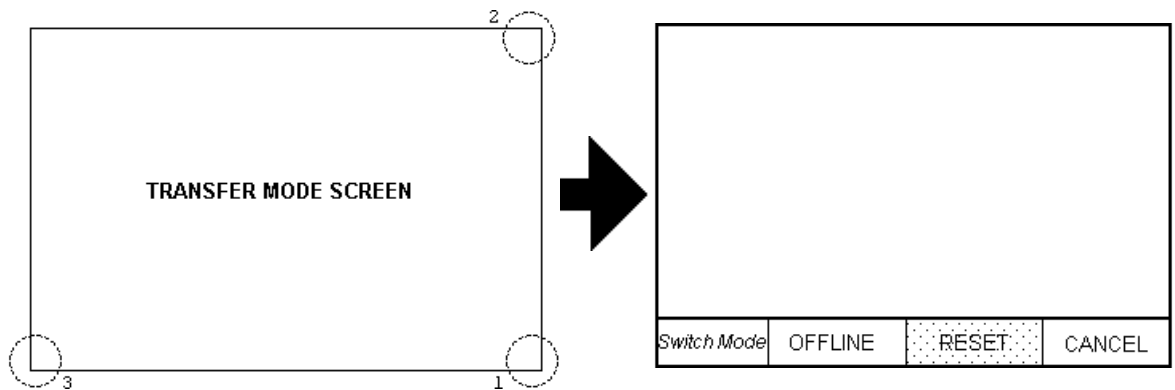
Designates either One Point, Two Point or No Slide. When No Slide is selected, dragging one's finger across the touch screen will elicit no screen response, and only individually selected points will register.

FORCE RESET

Set up whether or not a FORCE RESET operation is in effect.

Steps to run FORCE RESET

While holding down the bottom right corner (1) of the screen, touch the upper right corner (2). At the same time, touch the bottom left corner (3) to enter the FORCE RESET Operation. To activate Reset, touch the **RESET** button, to transfer to OFFLINE Mode, touch **OFFLINE**.



- **FORCE RESET can occur during either RUN mode or OFFLINE mode.**



- **The FORCE RESET mode cannot be entered while the GLC is starting up.**
- **Entering FORCE RESET is possible even when RUN operations (PLC <— >GLC communication) are not being performed.**

Chapter 5 - Initializing the GLC

CONTRAST ADJUSTMENT

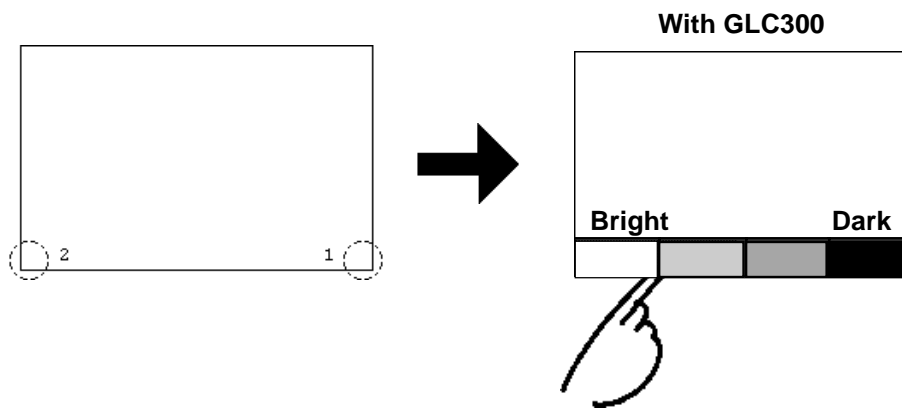
The GLC300 cannot adjust screen color contrast.

BRIGHTNESS ADJUSTMENT

When set to ON, BRIGHTNESS ADJUSTMENTS can be accomplished through touch input.

Touch the bottom left corner (2) of the screen while holding down the bottom right corner (1) to enter BRIGHTNESS ADJUSTMENT mode. Touch the left-side of the bar to brighten the display; touch the right-side of the bar to dim the display.

The GLC300 series unit has 4 levels.



Note:

- To end BRIGHTNESS ADJUSTMENT mode, touch anywhere outside the bottom of the screen.
- BRIGHTNESS ADJUSTMENT mode cannot be entered while waiting for GLC to start up.
- BRIGHTNESS ADJUSTMENTS can be made even during RUN mode (PLC \longleftrightarrow GLC communication).

4. COMMUNICATION SETUP

These fields set *when* an error message is reported after a GLC \longleftrightarrow PLC communication error is detected. This ensures an error has actually taken place and not just slight breaks in communication or slowness in processing data on one side or the other.

COMMUNICATION SETUP		SET	CANCEL
RECEIVE TIMEOUT (1-127)	[]	SECOND	
RETRY COUNT (0-255)	[]		

RECEIVE TIMEOUT

Set up how long the GLC unit will wait when there is nothing being sent to it. (This is the *Timeout Time*.) However, if there is no cable connected up, then regardless of the time set up here, the Timeout value is 1 second. The default value is 10 seconds.



- **When a value of over 30 seconds is set here, and a screen is transferred from the PC while a PLC Communication Time error has occurred, an error may also appear on the PC side.**

RETRY COUNT

This value designates the number of times the GLC retries sending a command before it displays an error messages as a PLC communication error. The default value is 2.

If communication cannot be performed even after trying the number of times designated here, the GLC displays an error message.

Even when an error message is displayed, the GLC continues to send the command until it is received normally.

5.5 PLC SETUP

This is the setup mainly related to the system data area and unit No. Because 1:1 and n:1 GLC connections utilize different settings, confirm your connection's needs before using any settings.

1. SET UP OPERATION SURROUNDINGS (1:1)

Enter the PLC System Data Area and the Unit Number settings here.



- **This setup is only necessary when using the Direct Access format.**

STARTING ADDRESS OF SYSTEM DATA AREA

Setup the PLC's Data Register (D), Data Memory (DM), etc. allotted by the STARTING ADDRESS OF SYSTEM DATA AREA.

UNIT NO.

Set up the PLC UNIT number here. Make sure it matches the one set up in the PLC.

SYSTEM AREA—READING AREA SIZE (0-256)

When using a Block Display Trend Graph, setup the Reading Area Size (in word units) to match the Trend Graph's data size. Setup when you wish to allocate the Reading Area in the PLC Data Register (D), or Data Memory (DM).



- **If you are not using the Reading Area, leave the 0 default values intact. High Speed Communication can be performed as a result.**

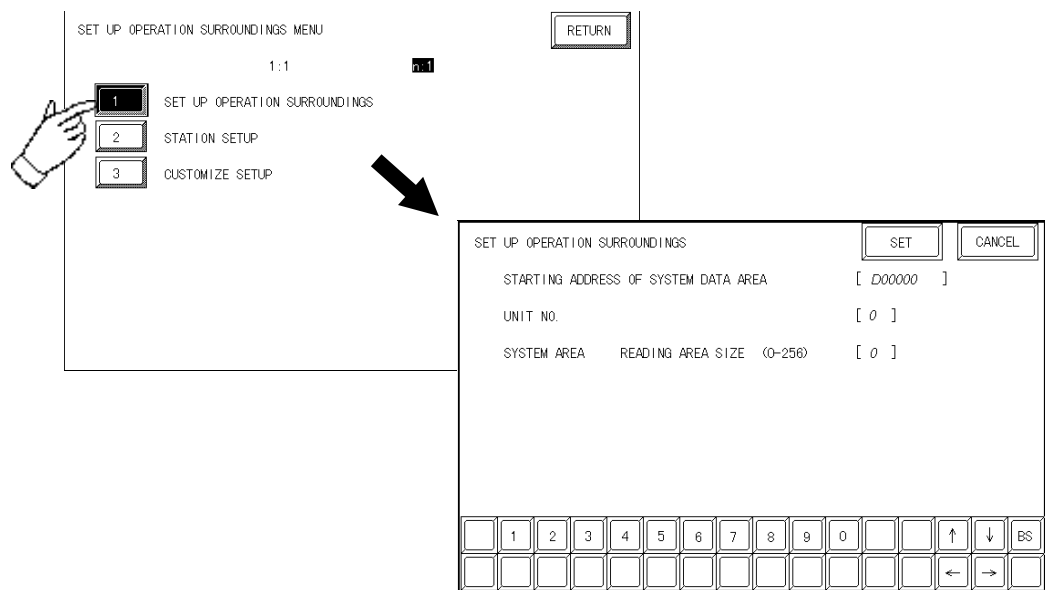
2. SET UP OPERATION SURROUNDINGS (n:1)

This is the setup for the PLC System Data Area and the Unit Number for an n:1 (multi-link) PLC connection.

Reference For more about the SYSTEM DATA AREA with the n:1 (multi-link) connection, refer to *the GP-PRO/PB III for Windows PLC Connection Manual; 4.6 SYSTEM AREA SETUP.*



- This setup is only necessary when using the Direct Access format.



STARTING ADDRESS OF SYSTEM DATA AREA

Setup the PLC's Data Register (D), Data Memory (DM), etc. allotted by the STARTING ADDRESS OF SYSTEM DATA AREA.

UNIT NO.

Set up the PLC UNIT number here. Make sure it matches the one set up in the PLC.

SYSTEM AREA—READING AREA SIZE (0-256)

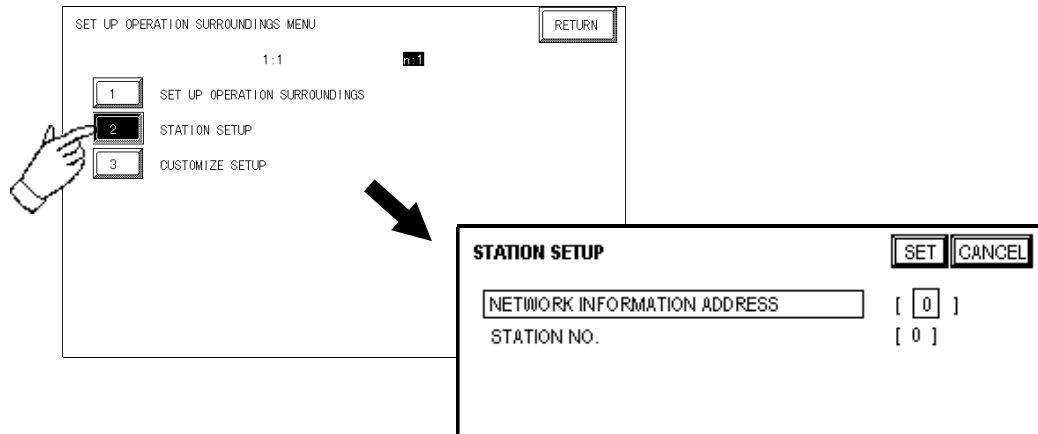
When using a Block Display Trend Graph, setup the Reading Area Size (in word units) to match the Trend Graph's data size. Setup when you wish to allocate the Reading Area in the PLC Data Register (D), or Data Memory (DM).



- If you are not using the Reading Area, leave the 0 default values unchanged. This will allow High Speed data transmission to be performed.

3. STATION SETUP (n:1)

The STATION SETUP, necessary for the n:1 (multi-link) setup, checks whether correct communications run with the connected GLC System configuration.



NETWORK INFORMATION ADDRESS

In the n:1 (multi-link) connection, the Network Information uses 2 words in its correspondences. These two (2) words consist of a Connection List and a Validation List (described later in this section). These areas are allocated in the PLC's Data Register (D) or Data Memory (DM).

PLC Data Register

+0	CONNECTION LIST	PLC → GLC
+1	VALIDATION LIST	GLC → PLC



Important

In the NETWORK INFORMATION ADDRESS, setup the same address to all the GLC's connected to the same link unit. Furthermore, when there are 2 ports in the connected link unit, do not make them the same address.

■ Connection List

The word address for the Connection List sets up the number of GLC's connected to the PLC, which must be registered beforehand on the PLC side. When these GLC's are connected to the PLC, the corresponding PLC bit numbers for the particular GLC Stations (see below) turn ON.



Note:

- **When the GLC is connected to the PLC, and the option of GLC only correspondence ends and OFFLINE mode is entered, the GLC Station Number turns the corresponding PLC bit OFF.**

Bit 15

Bit 0

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

Chapter 5 - Initializing the GLC

For example, when these 4 GLC units—bit 0, bit 2, bit 3, bit 5—are connected, 002D (h) is written here.

Connection List

0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

 002D (h)



- **Be certain to setup this data before running.**
- **Turn all bits not related to the GLC OFF.**

■ Verification List

This area responds to the correspondence from each connected GLC. In the Verification List, when the same bit numbers as the Connection List turn ON, the correspondence is accepted. The Station Numbers of the communicating GLCs turn their corresponding PLC bit number ON.

Bit 15 Bit 0

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

If the correspondence between the GLC and PLC is correct, the same value as in the Connection List is written to the Verification List.

For example, the value 002D (h) in the Connection List, setup as the 0 bit, 2 bit, 3 bit, and 5 bit, writes to the Verification List.

Connection List

0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

 002D (h)

Verification List

0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

 002D (h)



- **When the Connection List and Verification List do not match, a COMMUNICATION ERROR occurs. Check the setup again.**
- **When changing the connection, first turn all the bits OFF.**

STATION NO.

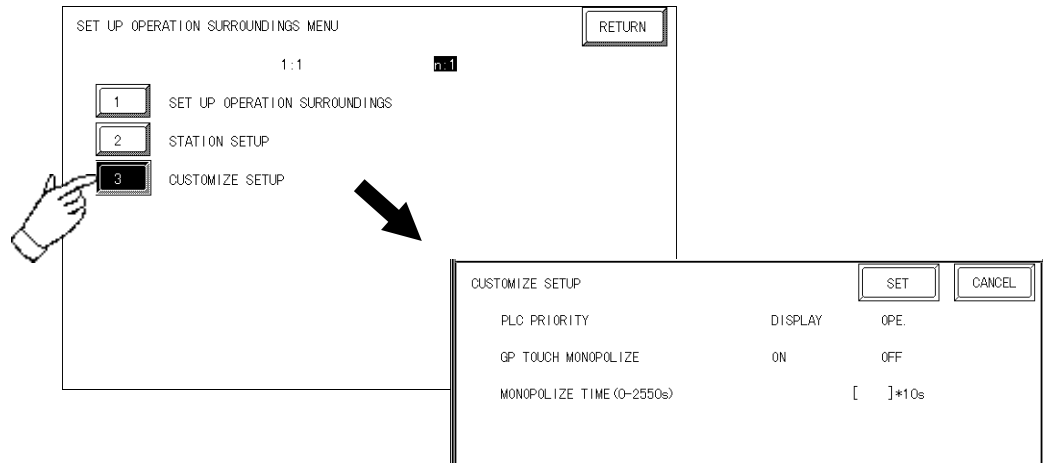
This is the setup for the GLC Station Number mentioned in the above section. The setup range is from 0 to 15, and the only other restriction is the GLC STATION NO. must be unique in the system. If STATION NO.'s are repeated, a COMMUNICATION ERROR occurs.



- **The STATION NO. is the number allocated to the particular GLC unit. This number is not related to the Link Unit Machine number.**

4. CUSTOMIZE SETUP (n:1)

The Customize function modifies the n:1 (multi-link) connection's communication method to make it more effective. To run communication efficiently, the user should first determine whether they wish to have Operation or Display priority set for the GLC. Based on this, the communication response speed can be upgraded. (However, this also depends on the screen information displayed)



PLC PRIORITY

According to how the GLC is used, select either Operation priority (OPE.) or Display priority.

- Display

Setup the GLC to this option when using the GLC mainly as a monitor screen. The GLC will command a higher display speed as a result; however, the response time for the touch panel's operations will slow.

- Operation

Setup the GLC to this option when using the GLC mainly as an operation panel. As a result, the GLC will command better touch panel numeric input and switch response times.

Leaving the GLC in this mode does not influence the touch panel operation response time of the rest of the GLC's very much; however, the screen display renewal cycle will slow down

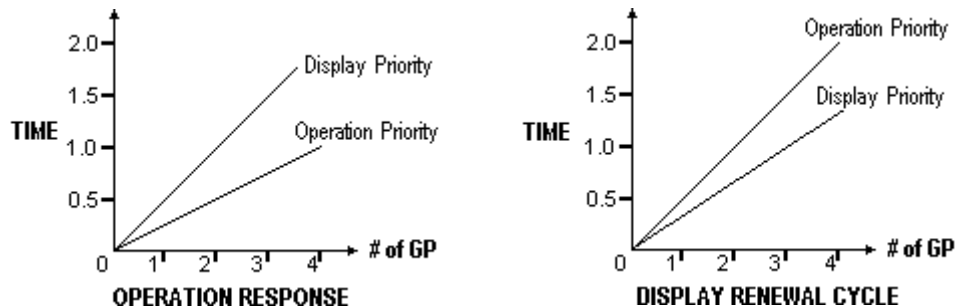


- ***With Customize Setup, be sure to use the same settings for all connected GLC's.***
- ***To increase the display speed, use consecutive addresses wherever possible. Also, set up bit addresses so that they are consecutive, when viewed in word units.***

Chapter 5 - Initializing the GLC

• Speed Difference between Display Priority and Operation Priority

When using the Mitsubishi Electric Corp. A2A PLC, with a scan time of 20ms with consecutive addresses (80 words not included in the System Area), the difference in reading speed is as shown in the following graphs.



GLC TOUCH MONOPOLIZE

The monopolizing of touch panel use can be set ON or OFF. When you want to use the PLC exclusively (**Reference** *PLC Connection Manual 4-5 About PLC Monopolize*) with a Momentary operation setup on the touch panel, turn GLC TOUCH MONOPOLIZE ON.

When this setup is ON, the touch panel uses the PLC exclusively whenever the momentary operation setup on the panel is pressed. In this way, you can use the inching operation with a momentary switch. When you stop pressing the panel, exclusive use ends.

MONOPOLIZE TIME (0 to 2550s)

This field controls the length of time for the monopolize process when no other touch panel operations are performed. The Monopolize process begins when the System Data Area's 7th bit of word address LS14 turns ON, and ends either when the bit turns OFF, or when the time set here elapses.

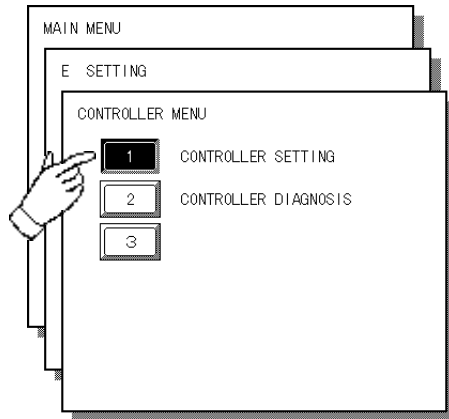


- Pressing the touch panel in the middle of the monopolize process interrupts the MONOPOLIZE TIME function, and ends exclusive use.
- When MONOPOLIZE TIME is set to 0, the monopolize function does not end automatically.

Reference *For more about the contents of System Data Area LS6 (status) and LS14 (control), refer to the GP-PRO/PB III for Windows PLC Connection Manual.*

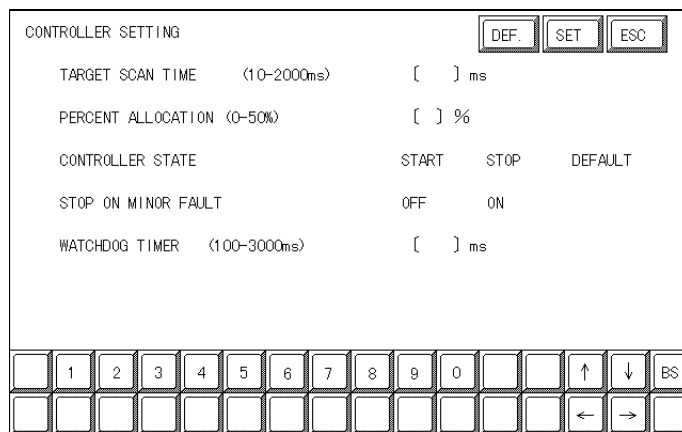
5. Controller Setup

Here, items related to the controller are set up. The controller setup includes CONTROLLER SETTING, CONTROLLER DIAGNOSIS and I/O driver settings.



Reference For the explanations about controller self-diagnosis and I/O driver settings, refer to *the Pro-Control User's Manual (included in the Pro-Control Editor package)*.

Data set up via the Pro-Control Editor or GLC's CONTROLLER SETTING is written in the GLC's nonvolatile memory. Although the default value has been entered in the CONTROLLER SETTING's each item, be sure to alter them according to the usage purposes.



TARGET SCAN TIME (10 - 2000ms)

Here, the total time required by the controller and the GP is set up. The controller time represents the time required to perform an I/O read, the logic program operation, and an I/O write. The setup range is from 10 to 2000ms. When entering the TARGET SCAN TIME setting, the PERCENT ALLOCATION becomes 50%.

Chapter 5 - Initializing the GLC

PERCENT ALLOCATION (0 - 50%)

Here, the controller time's ratio to the total scan time is designated. The setup range is from 0 to 50%. When PERCENT ALLOCATION is used, the TARGET SCAN TIME is disabled.

CONTROLLER STATE

Designates the operation mode (START, STOP or DEFAULT) used when the GLC's power is turned ON.

STOP ON MINOR FAULT

Designates whether logic program operation is continued or stopped when a minor problem occurs during controller use. To continue RUN operation, select "ON," and to stop operation when a problem occurs, select "OFF."

Reference  *Pro-Control Editor's Online Help*

WATCHDOG TIMER (100 - 3000ms)

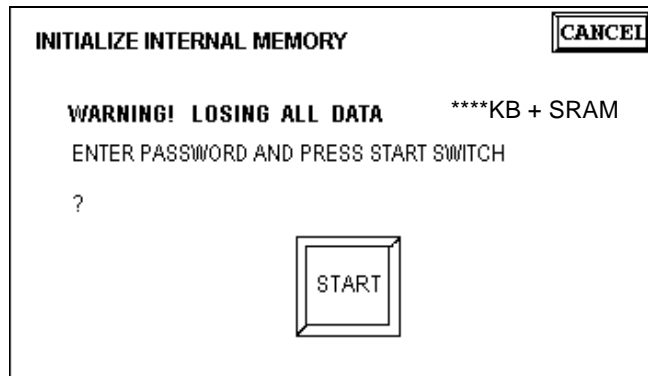
Designates the watchdog time setting usual during controller and GLC operation time (100 to 3000ms). Enter a value in 100ms units. Entering "0," disables the watchdog function.

5.6 INITIALIZE INTERNAL MEMORY

This command erases all the GLC screen data and initializes the GLC's SRAM.



- **You cannot cancel the Initialization procedure after pressing the Start key.**
- **Initialization does not erase the SYSTEM SET UP, the SIO protocol, or the internal clock settings.**

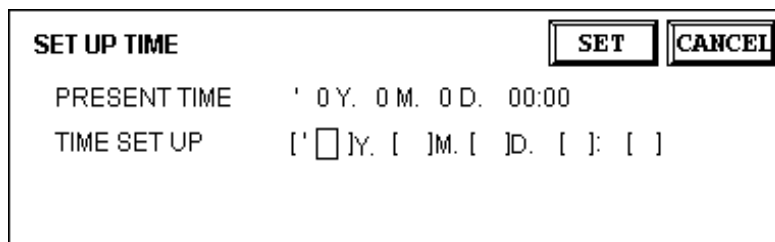


Enter the common password **1101**, or the password entered in the SYSTEM SET UP screen.



- **The time required for Initialization is 20 to 30 seconds.**

5.7 SET UP TIME



Sets the GLC's internal clock.

SET UP TIME

Enter date and time corrections to the date and time displayed in the PRESENT TIME.



- **The GLC's internal clock has a slight error. At normal operating temperatures and conditions, with the GLC 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 +90 to -380 seconds per month. For systems where this degree of error will be a problem, the user should be sure to monitor this error and make adjustments when required.**
- **Year, month, day, hour, and minute data can be written to the system data area's clock data, in the same manner as the OFFLINE mode.**

5.8 SET UP SCREEN

The initial screen display upon powering up, the character size when in RUN mode, and other related general screen items are setup here.

SET UP SCREEN		SET	CANCEL																																
INITIAL SCREEN NO.	(1-8999) [B]																																		
ALARM MESSAGE	V SIZE 1 2 4																																		
	H SIZE 1 2 4																																		
ONLINE ERROR DISPLAY	ON OFF																																		
FONT SETTING	I-ASCII JAPAN KOREA TAIWAN CHINA																																		
KANJI FONT QUALITY	STANDARD HIGH (1) HIGH (1, 2)																																		
<table border="1"> <tr> <td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>0</td><td></td><td></td><td>↑</td><td>↓</td><td>BS</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>←</td><td>→</td><td></td> </tr> </table>					1	2	3	4	5	6	7	8	9	0			↑	↓	BS														←	→	
	1	2	3	4	5	6	7	8	9	0			↑	↓	BS																				
													←	→																					

INITIAL SCREEN NO.

Set up the screen file number that will display first upon powering up. If the BIN option for DATA TYPE OF SCREEN NO in SYSTEM SET UP had been selected, enter a number from 1 to 8999. Or, if BCD was the option set up, then input a number from 1 to 1999.

ALARM MESSAGE

Set up the character size of the ALARM MESSAGE when the Alarm Bulletin is activated.

1

Height=1; Width=1
16x8 pixels

2

Height=2; Width=2
32x16 pixels

4

Height=4; Width=4
64x32 pixels

ONLINE ERROR DISPLAY

Set up whether or not error messages display during RUN mode.

FONT SETTING

Select the character font that displays during RUN mode.

KANJI FONT QUALITY

When "FONT SETTING" is set to "JAPAN" :

When the kanji (Chinese) character quality is set to HIGH, larger than double sized (32x32) characters display as 32 dot characters. When STANDARD is selected, the display becomes a 16 dot font multiple.

When "FONT SETTING" is set to any other setting :

Selecting the HIGH setting will cause single-byte characters (with some exceptions) to display as high quality characters. Selecting STANDARD will cause standard single-byte characters to be displayed.



- When set to the HIGH quality setting, the Level 1 JIS Kanji Code standard is the object. Level 2 standard characters, no matter what the setting, display as 16 dots.



Chapter 6

GLC RUN Mode and Errors

1. GLC RUN Mode
2. Troubleshooting
3. SELF-DIAGNOSIS
4. Error Messages

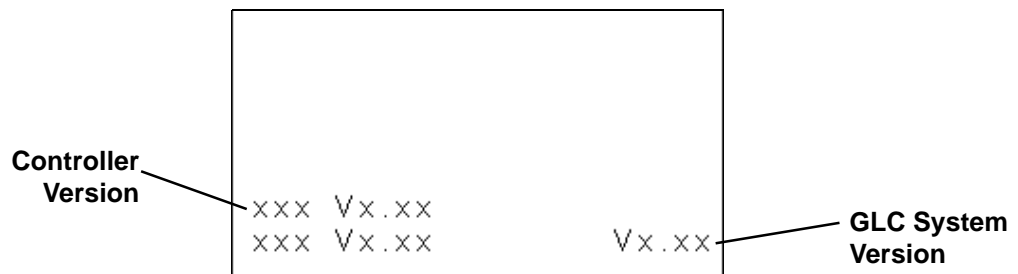
This chapter describes both the GLC RUN mode and GLC problem solving processes.

6.1 GLC RUN Mode

There are two ways of entering the GLC's RUN mode; first, immediately after plugging in the unit's power cord, and the other, from the GLC's OFFLINE mode.

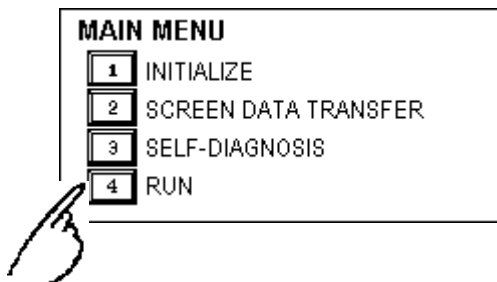
1. After Powering Up the GLC

First, connect the GLC's power cable. After the unit has powered up, the START TIME value, set up in INITIALIZE area's SYSTEM SET UP feature, determines how long the display shown below is shown. If, however, a screen has not been designated in the INITIALIZE area's SET UP SCREEN feature, or if the screen itself does not exist, then this display will remain.



2. Via OFFLINE Mode

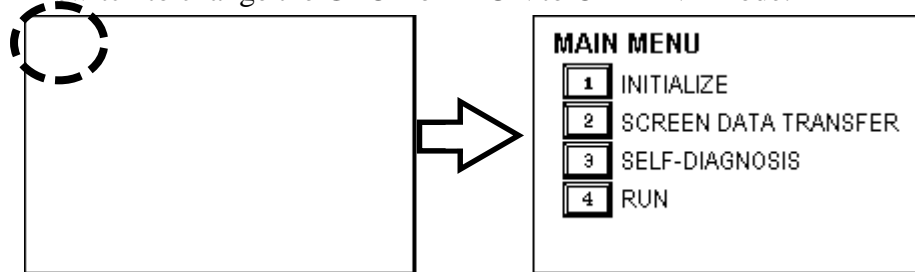
Touch the MAIN MENU's RUN selection to start your downloaded "project". The INITIALIZE area's SET UP SCREEN feature designates the first screen that appears in RUN mode, and, after this screen appears, communication with the PLC begins. If the designated screen does not exist, the screen displayed when turning the power ON appears.





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

E.g. After powering up the GLC, the initial screen that appears is equipped with a built-in (invisible) switch in the top left corner. Touch this switch to change the GLC from RUN to OFFLINE mode.



6.2 Troubleshooting

Here, the means to locate and remove causes of problems are explained. It is assumed that the problems described here are caused by the GLC unit's problems, not host (PLC)'s. If problems caused by the host (PLC) occur, please refer to the host (PLC)'s manual.

1. Possible Types of Trouble

Shown below are some problems that may occur while using this unit.

(A) No Display

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

(B) No GLC/HOST Communication

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

Reference 6.4 Error Messages

(C) Touch Panel Does Not Respond

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

(D) OFFLINE Displays During RUN Mode

Enters OFFLINE mode unexpectedly during operation. Enters OFFLINE mode when the power is turned ON.

(E) The Logic Program Does Not Operate.

The desired program does not appear on the GLC's screen. The control memory's SRAM backup data is not preserved.

Chapter 6 - GLC RUN and Errors

For these first three problems, see the following pages' troubleshooting tables. For the fourth problem (D), a SYSTEM ERROR may have developed while displaying the OFFLINE mode screen.*1

Reference 6.4.2 Error Message Details

For problem (E) possible cause(s) and countermeasure(s), refer to

Reference 6.2.2 (D) "Logic Program Does not Operate" Checklist



- Note:** • It is assumed that the problems described in this chapter are caused by the GLC unit's problems, not host (PLC)'s. If problems caused by the host (PLC) occur, please refer to the host (PLC)'s manual.

2. Troubleshooting Checklists


Refer to the following checklists when trouble with the GLC occurs. Follow the steps given in order to locate the cause of the problem. If you still cannot fix the problem, or the characters ((H)) (hardware problem), or ((S)) (software problem) are used, please contact your local authorized Proface dealer for service and advice.

(A) "No Display" Checklist

No.	Check Item	OK	Corrective Measure(s)
1	Unplug the GLC's Power Cord.		
2	Is the GLC's Power Cord correctly connected to the GLC?		Connect the power terminals correctly.
3	Is the voltage being supplied within the specified voltage range?		Reference 2.1 General Specifications
4	Reconnect the GLC's Power Cord.		
5	Does the GLC's power lamp light?		Does not light. ((H))
6	Are both the backlights lit?		(1) In the PLC's System Data Area, if the backlight's OFF bits are turned ON, the backlight will not light. Turn the appropriate bits OFF. Reference PLC Connection Manual (2) If one or both of the backlight(s) are burned out, change both backlights. Reference 7.3 Changing the Backlights (3) If neither (1) nor (2) succeed in fixing the problem, please contact your local GLC distributor. ((H))
7	In the PLC's System Data Area, is data written to the backlight's display OFF area?		Delete the OFF data. Reference PLC Connection Manual
8	Has all the data from the Screen Editor software been transferred correctly?		Reference Operation Manual

*1 If the user has touched the top left corner of the screen within 10 seconds after powering up the GLC, the change to the OFFLINE screen is normal.

Chapter 6 - GLC RUN and Errors

No.	Check Item	OK	Corrective Measure(s)
9	Unplug the GLC's Power Cord and disconnect all other cables attached to the GLC.		
10	When the Power Cord is reconnected, does touching the upper left corner of the GLC change the unit to OFFLINE mode?		Reference <i>Ch. 4 - OFFLINE Mode</i>
11	Check that the [INITIAL SCREEN NUMBER]'s setting is correct. Path: [MAIN MENU] to [SYSTEM ENVIRONMENT SETUP] to [SET UP SCREEN] menu.		Reference <i>5.8 SET UP SCREEN</i>
12	Use the [INTERNAL EPROM (SCREEN AREA)] feature to check the GLC's screen. Path: [MAIN MENU] to [SELF-DIAGNOSIS] menu.		 This action will destroy all the GLC's current data Reference <i>SELF-DIAGNOSIS</i> If this fails to correct the problem, ((H))
13	Use the [INITIALIZE MEMORY] feature to clear the contents of memory. Path: [MAIN MENU] to [INITIALIZE] menu.		Reference <i>5.6 INITIALIZE MEMORY</i>
14	Unplug the GLC's Power Cord and connect the GLC's Data Transfer cable.		Reference <i>Operation Manual</i>
15	Reconnect the GLC's Power Cord and re-transfer the screen data from your PC.		
16	Unplug the GLC's Power Cord and disconnect the Data Transfer cable. Then, attach the PLC data transfer cable to the GLC.		Be sure only the GLC's Power Cord and the PLC data transfer cable are connected. Reference <i>3.2 Wiring Cautions, and PLC Connection Manual</i>
17	Does reconnecting the GLC's Power Cord cause screen data to appear?		If NO, ((S))
18	Unplug the GLC's Power Cord and securely attach all the GLC's cables. Then, reattach the GLC's Power Cord.		
19	Does the screen data display normally?		If NO, try to confirm which cable may be causing the problem. ((H))

***System Data Area Addresses**

Feature Connection	Backlight OFF	Display OFF
Direct Access Type	Address +14 (Bit 0)	Address +9
Memory Link Type	Address 11 (Bit 0)	Address 12

Chapter 6 - GLC RUN and Errors

(B) "No GLC/Host (PLC) Communication" Checklist

When the GLC will not communicate with the host PLC, follow the checklist below to discover the origin of the problem and find a suitable solution.

Or, if an error message appears on the screen, check the error code (refer to the *Error Message* section in this chapter) to find the appropriate solution.

No.	Check Item	OK	Corrective Measure(s)
1	Unplug the GLC's Power Cord.		
2	Is the GLC's Power Cord correctly connected to the GLC?		Connect the power terminals correctly.
3	When using an RS422 cable: Is the terminating resistor correctly attached?		Attach the resistor correctly. A terminating resistor's usage, placement location, and resistance value will vary according the PLC used. Reference <i>PLC Connection Manual</i>
4	Was the correct [PLC Type] selection made in the Screen Creation software?		Re-designate the PLC type. Reference <i>Operation Manual</i> Reference <i>PLC Connection Manual</i>
5	Are any tag address settings incorrect?		Correct the incorrect settings. Reference <i>Operation Manual</i> Reference <i>Tag Reference Manual</i> If the problem with the settings cannot be found, ((S)).
6	Unplug the GLC's Power Cord. Disconnect all other cables connected to the GLC.		
7	Reconnect the GLC's Power Cord and enter the GLC's OFFLINE mode.		Reference <i>Ch. 4 - OFFLINE Mode</i>
8	Are all the SET UP SIO area's settings correct? Path: [MAIN MENU] to [SET UP I/O]		Reference <i>5.4.1 SET UP SIO,</i> Reference <i>PLC Connection Manual</i>
9	Is the result of the [COMMUNICATION CHECK] OK? Path: [MAIN MENU] to [SELF-DIAGNOSIS] menu		To perform this check a special cable is required. Reference <i>6.3.2 Self-Diagnosis Details</i> If not OK, ((H))
10	Unplug the GLC's Power Cord and check that the Data Transfer cable is connected correctly.		Reference <i>Operation Manual</i>
11	Reconnect the GLC's Power Cord and transfer normal screen data to the GLC.		
12	Unplug the GLC's Power Cord and unplug the GLC's Data Transfer cable. Next, connect the host (PLC)'s data transfer cable to the GLC.		Be sure only the GLC's Power Cord and the PLC's data transfer cable are connected. Reference <i>3.2 Wiring Cautions, PLC Connection Manual</i>
13	Reconnect the GLC's Power Cord. Is data transfer now possible?		If it is not possible, please check that the PLC's data transfer settings are correct. ((S))
14	Unplug the GLC's Power Cord and check that all cables are correctly connected to the GLC. Next, reconnect the GLC's Power Cord.		
15	Did performing the above actions solve the problem?		If not, try to confirm which cable is causing the problem. ((H))

(C) "Touch Panel Does Not Respond" Checklist

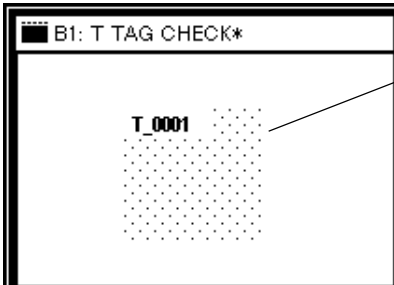
When the touch panel does not respond, or its reaction time is very slow after it is pressed, please follow the flowchart below to find the origin of the problem, and the appropriate solution.

No.	Check Item	OK	Corrective Measure(s)
1	Unplug the GLC's Power Cord. Disconnect all other cables from the GLC.		
2	Re-connect the GLC's Power Cord and touch the top left corner of the GLC's screen to enter OFFLINE mode.		Reference <i>Ch. 4 OFFLINE MODE</i>
3	Is the SET UP TOUCH PANEL screen's data correct? Path: [MAIN MENU] to [INITIALIZE] to [SET UPI/O] area		Correct the settings. Reference <i>5.4.3 SET UP TOUCH PANEL</i>
4	Is the TOUCH PANEL diagnostic result OK? Path: [MAIN MENU] to [SELF-DIAGNOSIS] area		Reference <i>6.3 SELF-DIAGNOSIS</i> If not OK, ((H))
5	Are any tag address settings incorrect?		Correct the settings. Reference <i>Operation Manual</i> Reference <i>Tag Reference Manual</i>
6	Unplug the GLC's Power Cord and check that the PC to GLC's data transfer cable is connected correctly.		Reference <i>Operation Manual</i>
7	Reconnect the GLC's Power Cord and resend the previously corrected data, or other, normal, data to the GLC.		
8	Unplug the GLC's Power Cord, disconnect the data transfer cable and connect the PLC's data transfer cable.		Be sure that only the GLC's Power Cord and the PLC's data transfer cable are connected. Reference <i>3.2 Wiring Cautions</i> Reference <i>PLC Connection Manual</i>
9	Reconnect the GLC's Power Cord and check the GLC's display. Is it correct?		If not, ((S))
10	Unplug the GLC's Power Cord, check that all the GLC's cables are connected correctly, and reconnect the GLC's Power Cord.		
11	Does the GLC's touch panel operate correctly?		If not, check to find the cable that is causing the problem. ((H))

Chapter 6 - GLC RUN and Errors



The T-Tag touch area is normally a square shape, however if the Tag has been narrowed (stretched) to the point of being a single line, or is overlaid on top of another T-tag, the tag will not function correctly.



When the T-tag's dotted pattern appears like this, the tag has been properly placed.

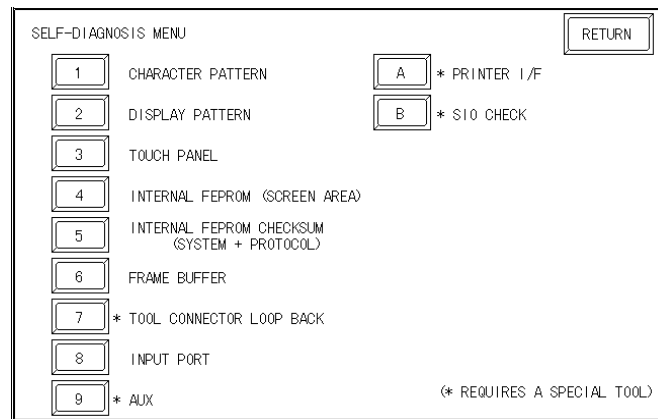
(D) "Logic Program Does not Operate" Checklist

Problem	Possible cause	Countermeasures
The control memory's SRAM backup data does not exist.	Battery problem	Replace the unit.
	Memory problem	Replace the unit.
Abnormal program operation	Incorrect program transfer. Memory has a program backup area. The program may not have been transferred from there to the operation area.	Use Pro-Control Editor to restart the control function. <i>Reference: Pro-Control Editor User's Manual</i>
	When switching output data's RUN and STOP operations, the backup data clear control function is enabled.	Disable this function.
After entering RUN mode, the GLC enters STOP mode again.	Abnormal command execution or major problem may have occurred.	Connect the program. Check the system variable "#FaultCode."

6.3 SELF-DIAGNOSIS

The GLC unit is equipped to check its own System and Interface for any problems. Use it to help diagnose any problems.

1. GLC SELF-DIAGNOSIS Item List



- 1 Checks the characters inside the internal Character ROM.
- 2 Checks all the figures and tiling patterns.
- 3 Checks each GLC touch panel square.
- 4 Checks the internal hard disk contents (FEPRM).
- 5 Checks the System and Protocol of the GLC Internal Memory (FEPRM).
- 6 Checks the internal display memory (Frame Buffer).
- 7 *Checks the Tool Connector control lines and send/receive lines.
- 8 Checks the Input Port. (For Digital's maintenance use only)
- 9 *Checks the AUX control line.
- A *Checks the printer interface.
- B *Checks the RS-232C and RS-422 send/receive lines.



- **The SELF-DIAGNOSIS items marked with an asterisk (*) require special tools. Please prepare the required tool (cable) for each test.**

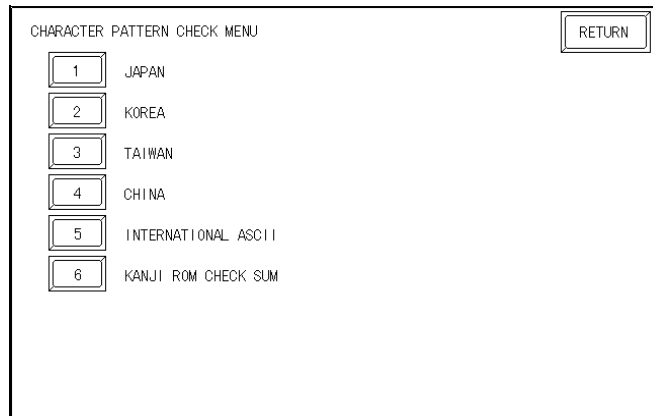
2. SELF-DIAGNOSIS - Details

This section explains the contents of SELF-DIAGNOSIS.

Reference For information on how to operate the Screen, refer to **Chapter 4, OFFLINE Mode.**

Reference For information about how to set up items connected to the GLC, refer to **Chapter 3, Installation and Wiring.**

CHARACTER PATTERN



Use this check, which runs the character ROM CHECKSUM CHECK, when characters do not display on the screen. Check each font pattern or the Kanji ROM using the sub-menu displayed above. If everything is normal, **OK** displays; if there is a problem, **NG** displays.

DISPLAY PATTERN

Used when the buzzer will not sound and when the device contents will not display correctly to check the drawing function. It does this by running checks on the various screen pattern displays (9 screens) and on the ON/OFF Display. When the ON/OFF Display is checked, the Buzzer ON/OFF check is run simultaneously. If everything is normal, **OK** displays; if there is a problem, **NG** displays.

TOUCH PANEL

Touch Panel check. Checks if each touch cell highlights when pressed.

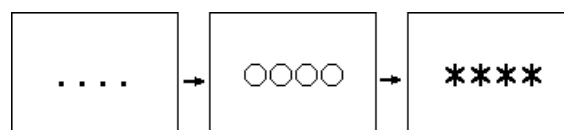


INTERNAL FEPROM (SCREEN AREA)

- **When this check is carried out, all the contents in the memory are erased. Please make sure that all data is backed up before running this check.**
- **After running the check, initialize the internal memory (FEPROM)**

This feature checks for any problems that may arise in the display. But to run the check, a password*1 is necessary.

When running the check, the screen will change as follows.



*1 Enter the password as setup in the INITIALIZE option, or use the default password 1101.

Chapter 6 - GLC RUN and Errors

AUX

This check uses the Input unit's LED lights, in the following order.

- ① Set AUX lines from TSW0 to BUZZ, ON.
- ② Once all of them turn ON, they will turn OFF in the same order.
- ③ Once all of them have turned OFF, the check is finished.

PRINTER I/F

PRINTER I/F checks to see if the printer operates normally. To perform this check, the printer must be connected.

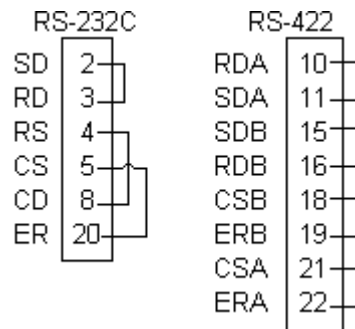
When a Print Buffer is used, sometimes an error occurs, so **be sure to connect the printer directly to the GLC.**

If the connection is normal, the printed section displays **20~7D<HEX>** and **A0~DF<HEX>** and **OK**; if there are problems, an error message appears.

SIO CHECK

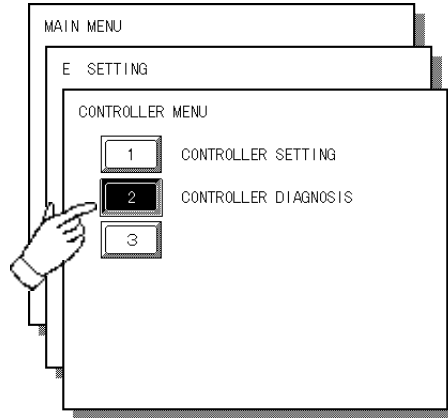
Checks the RS-232C and RS-422 SIO lines for areas where communication problems develop. In the menu, select which check to run. To run the check, connecting the SIO cable is necessary. If all is normal, **OK** displays; if there is a problem, an error message appears.

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



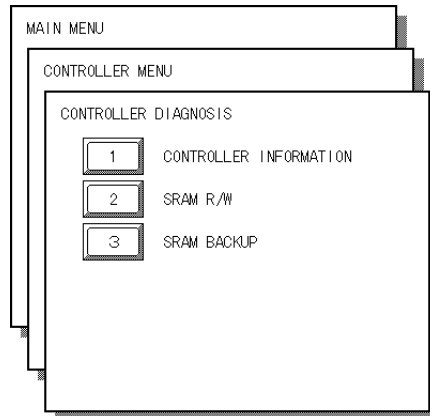
3. Controller Self-Diagnosis Item List

In this section, settings related to Controller are mainly explained. CONTROLLER MENU includes CONTROLLER SETTING and CONTROLLER DAIGNOSIS. Here, select CONTROLLER DAIGNOSIS.



Reference For more information, refer to *the Pro-Controller User's Manual (included in the Pro-Control Editor package)*

Data set up via the Pro-Control Editor or GLC's CONTROLLER SETTING is written in the GLC's nonvolatile memory. Although the default value has been entered in the CONTROLLER SETTING's each item, be sure to alter them according to the usage purposes.



CONTROLLER INFORMATION

Shows version information.

SRAM R/W

Performs read/write check for SRAM. This time, data for backup check is written.

SRAM BACKUP

Performs backup check for SRAM. To perform this check, be sure to complete SRAM R/W and turn the GLC power OFF. Then, you can perform this check.



Once SRAM R/W and SRAM BACKUP are performed, temporarily-retained data will be lost.

6.4 Error Messages

This section explains the messages that appear when an error has occurred in the GLC unit during RUN mode. The origin of the problem behind each error message is explained with appropriate ways of disposing of the error. After a problem has been solved, unplug the GLC's power cord and then reattach it. (*Only the latest error message will appear on the GLC screen*)

1. Error Message List

The error messages listed below appear on the GLC unit. Instructions on how to find and solve problems causing these error messages are explained on the following pages.

- SYSTEM ERROR
- ILLEGAL ADDRESS IN SCREEN DATA
- UNSUPPORTED TAG IN SCREEN DATA
- PLC NOT CONNECTED (02:FF) and (02:F7)
- PLC NOT RESPONDING (02:FE)
- RECEIVE DATA ERROR (02:FD)
- GP STATION NO. DUPLICATION ERROR (02:F9)
- NETWORK ADDRESS ERROR (02:F8)
- PLC COM. ERROR
- SCREEN MEMORY DATA IS CORRUPT
- CLOCK SETUP ERROR
- SCREEN TRANSFER ERROR
- SCREEN TAG LIMIT EXCEEDED
- OBJ. PLC HAS NOT BEEN SETUP



About CLOCK SETUP ERROR

This error message will appear when the GLC's internal backup battery (used for both the internal clock and the backup SRAM when the power cord is not connected) becomes weak and can no longer preserve that data.

The battery's strength is only checked when the GLC is started up, and this error can only be cleared by turning the GLC OFF, then ON again.

If the GLC's power cord is reconnected after this error appears, data can be safely backed up for approximately 24 more hours of use. (Approximately 3 working days)

2. Error Message Details

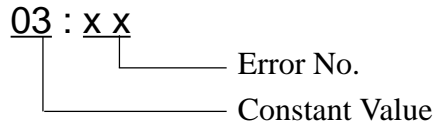
SYSTEM ERROR

Indicates a fault in the basic operations of the GLC.

Following the error message, an error code, as shown, will appear. Report the error number and details on how the error developed to your local GLC distributor.

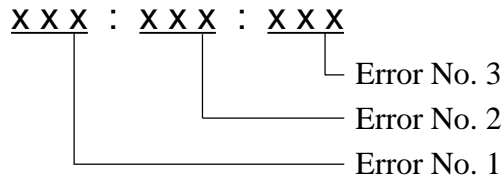
(Ex. 1) • SYSTEM ERROR (03 : x x)

Displays when an unrecoverable error occurs during data transfer from a PC.



(Ex. 2) • SYSTEM ERROR (x x x : x x x : x x x)

Displays when an unrecoverable error occurs during data transfer.



- Check if the GLC's Power Cord and the Input signal line have been wired incorrectly.
- Check that the FG line has been grounded correctly, according to standards.
- Re-send the screen data from the PC to the GLC.
- If other types of communication errors have also occurred, try to correct those problems also.

Reference *RECEIVE DATA ERROR, PLC COM. ERROR*

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

When OFFLINE mode displays during in RUN mode

When the GLC changes to OFFLINE mode without the user first pressing the screen, there is a possibility that the screen data has been damaged. In this case, after the SYSTEM ERROR displays, the screen automatically reverts to OFFLINE mode after about 10 seconds. Run the INITIALIZE MEMORY command and transfer the Pro-control Editor's screen data again from your PC.

Chapter 6 - GLC RUN and Errors

(1) GLC-related Problems

When a problem occurs suddenly during operation regardless of the GLC's operation conditions, it is considered that it is caused by the GLC in this case, influence from noise from power cables and communication lines as well as from static electricity should be considered. Possible countermeasures are, first, to check the power cable installation and FG line's grounding condition, then the communication line wiring and FG line.

(2) Screen data or Program Problems

If a problem occurs during GLC operation, the cause may be abnormal/incorrect screen data or an incorrect program being transferred to the GLC. Countermeasures are, first, to re-transfer screen data via GLC forced setup. Via this feature, the screen data and program are forced to transfer.

(3) GLC unit malfunction Problems

If the GLC recovers from an error via turning ON/OFF the power, the GLC unit is probably not malfunctioning. In order to determine the cause of the GLC's malfunction, perform self-diagnosis in the GLC's OFFLINE mode.

(4) GLC unit External Device-related Problems

When a problem occurs during printing, it is considered that the printer is causing the problem. Check the printer cable connection, FG line, and printer cable.

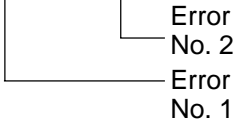
(5) Communication Errors Occur Continuously (only for link type)

When communication errors occur continuously over a long period of time, the GLC recognizes them as system errors. In such a case, remove the cause(s) of the errors.

ILLEGAL ADDRESS IN SCREEN DATA

Caused by addresses overlapping. Following the error message, error codes, as listed below, appear. If the error cannot be fixed, please report the error code and details on how the error developed to your local GLC distributor.

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



Overlapping Addresses Table

Error 1	Error 2	Meaning
0C1	191	All or part of the T-File* ¹ or S-tag address range overlap the addresses of System Data Area.
	192	
	193	
0C2	194	All or part of the System Data Area address, A-File, or S-tag address range overlap the addresses setup in a T-File* ¹ .
	195	
	196	
0C3	197	All or part of the T-File* ¹ , or the S-tag or K-tag address range overlap the address range set in an A-file.
	198	
	199	
0C9	19B	All or part of the T-File* ¹ , or the S-tag or K-tag address range overlap the address range set in an A-file.



- Overlapping addresses, other than the ones mentioned above, can also cause the Illegal Address message.

E.g. When the starting address of the System Data Area is set to 100, and the tag below is setup:

Tag Name/ Part ID No.	Word Address	Tag Format
N1	99	BCD32



The N-tag is set to 32 bits, meaning it uses two word addresses. Since the first address is 99, the second address must be 100. Address 100 is ineligible for use since it has already been used for the System Data Area.

UNSUPPORTED TAG IN SCREEN DATA

This message appears when the GLC currently in use does not support the desired Tag. Be sure to only use Tags that are supported by the current GLC.

Reference For Tag details, the *GP-PRO/PB III for Windows Tag Reference Manual*

*1 **Reference** For details about the T-File (trend graph) and A-File (alarm messages), refer to the *GP-PRO/PB III for Windows Tag Reference Manual*.

Chapter 6 - GLC RUN and Errors

PLC NOT CONNECTED (02:FF) (02:F7)

Displays when communication with the PLC has stopped for over 60 seconds, when there is a transmission timeout error, or when there is excess *noise*.

Check the data transfer cable wiring and connect correctly.

PLC NOT RESPONDING (02:FE)

Displays when there is a Reply Timeout Error, or when there is excess noise.

The origin of the problem and the matching solutions are listed in the table below.

PROBLEM	SOLUTION
1. The PLC is not turned ON.	1. Turn On the host's power switch
2. GLC unit INITIALIZE setup (Setup I/O, PLC Setting) is incorrect.	2. Setup the unit correctly and match up with the current host and Communication Cable.
3. The host and GLC powering up process was incorrect.	3. Turn the host's power On first, wait 2~3 seconds, then power up the GLC unit.
4. The Communication Cable was not connected properly.	4. Check the Communication Cable wiring and connect it up properly.

RECEIVE DATA ERROR (02:FD)

This problem arises as a result of one of these three:

- There is a problem in trying to receive the data
- The connected PLC and the PLC setup for the data is different
- Noise

These errors, except for noise, appear when the Communication Cable is pulled out when the GLC unit is On, or when normal communication operations are being run, but the GLC has been powered Off, then back On. To solve the problem, simply begin running transmissions again.

When the error is a result of noise, correct any improper connections.

GP STATION NO. DUPLICATION ERROR (02:F9)

This error appears for one of two reasons:

- The GLC number is same as the station number for another GLC. Check all the GLC station numbers.
- In the middle of correspondences, the PLC power has been turned On/Off. Reset the power on the PLC and GLC, in that order.

NETWORK ADDRESS ERROR (02:F8)

The SIO address setup for the GLC is different from other GLC's. Check the address setup for all the GLC's.

PLC COM. ERROR

Appears when the address setup for tags exceeds the address range on the host side, etc. Check the Error Number that appears and use the following table to solve the problem.

PLC COM. ERROR (02 : x x)

Error code (see the table below)
 Constant Value

Error #	Origin	Solution
FC	The communication settings for this unit and the host do not match.	Fix the SIO communication settings to match the host.
FB	The address set on a tag, the address used for storing data for Trend Graph, or the address set by an alarm message is out of a set range. (address range error) * Memory to Memory type. * Siemen's PLC Series	* When using GP-PRO2's Memory to Memory Type: Set the addresses within the set range of the System Data Area. (0~1023) * When using Siemen's Series PLC Type: Set up the Data Block in the PLC where the System Data area is set.
FA	Address range error	Set the addresses within the allowable range.
53	When using a Matsushita Electronics PLC, and there are too many screen tags, the PLC will not receive data.	Decrease the number of tags on the screen.
51	The tag address, Trend graph data storage address, Alarm message Registry address, and the like, do not exist in the PLC's internal memory. (In the case of Fuji Electric PLC)	Setup the addresses in a device range that exists.
Others	The Error Number for each PLC is displayed. Look up the Error Number in the indicated PLC manual. Or, report the Error Number to the PLC maker.	

SCREEN MEMORY DATA IS CORRUPT

Displays when the checksum of the screen memory data does not match because of a corruption in the screen files.

This error message is followed by error codes. By referring to the error code, you can check the screens that have errors. When a screen file has been corrupted, delete that file, and make a new one (or recall a backup copy if available).

SCREEN MEMORY DATA IS CORRUPT (x x x x : x x x x)

The Screen Number that has an error. The number of screens that
 (Displays only one per Screen Number.) have errors (Decimal)

Chapter 6 - GLC RUN and Errors

CLOCK SETUP ERROR

This message displays when the backup battery for the internal clock is dead. If the battery is incorrectly replaced, the battery may explode. To avoid the danger, please do not replace the battery yourself. When the battery needs a replacement, please consult with your local GLC distributor.

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

Reference Chapter 5, *Initializing the GLC*



Note:

- The life span of the backup battery depends on the battery's 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 Ambient Temperature	under 40°C	between 40 to 50°C	between 50 to 60°C
Expected Life Span	over 10 yrs.	over 4.1 yrs.	over 1.5 yrs

SCREEN TRANSFER ERROR

Displays when an error occurs in the data transmission from the screen editor to the GLC panel. Check if the cable is connected correctly and try retransmitting the screen data.

SCREEN TAG LIMIT EXCEEDED (max. of 384)

When tags are setup beyond the tag limit, these tags are made invalid. Tags are invalidated from the end tag, in the opposite order in which they were registered. Plus, when tags involve registered Windows and loaded screens, they are invalidated in this order: Window Registry, Load Screen. Further details for when multiple displays are set to one screen:

1. Disregard registered windows, starting from the end screen.
2. Disregard loaded screens, starting from the end screen.

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

OBJ. PLC HAS NOT BEEN SETUP (02:F9)

The host PLC setup in the Editor program (i.e. the .prw file) does not match the PLC in use. Use the Error Code that follows the error message to select the proper PLC type in the GLC and correct the INITIALIZE setup.

OBJ. PLC HAS NOT BEEN SETUP (x x)

|
The PLC number (*Hexadecimal*)
written to the System File

(See next page's Table)

Chapter 7

Maintenance

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

7.1 Regular Cleaning

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 a strong acid compound to clean the unit.
- Do not use hard or pointed objects to operate the touch-screen panel, since it can damage the panel surface.

2. Moisture Resistant Gasket Replacement

The moisture resistant gasket protects the GLC and improves its water resistance. For instructions on installing the GLC's gasket,

Reference *Chapter 3, Installation and Wiring*



- ***A gasket which has been used for a long period of time may have scratches or dirt on it, and could have lost much of its water resistance. Be sure to change the gasket periodically (or when scratches or dirt become visible).***

7.2 Periodic Check Points

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

GLC Operation Environment

- Is the operating temperature within the allowable range?
(0 to 40 degrees Celsius)
- Is the operating humidity within the specified range?
(30 to 85% RH)
- Is the operating atmosphere free of any corrosive gasses?

Electrical Specifications

- Is the input voltage appropriate?
24 VDC \pm 20%

Related Items

- Is are all cables connected properly? Are they loose?
- Are all mounting brackets holding the unit securely?
- Are there many scratches or traces of dirt on the moisture resistant gasket?

7.3 Changing the Backlight

The GLC300 Series units use CFL type backlights. The GLC300 series backlight is a long-life type, however the actual life of the backlight unit will vary depending on the GLC's operating conditions.

The GLC300's backlight(GP577RT-BL00-MS) has a life of 40,000 hours (appr. 4.6 years). When the backlight is lit continuously for the above period of time, its brightness reduces to about half of that of a new one's.

Backlights are sold separately as optional maintenance items. Refer to the following explanations when replacing your GLC unit's backlights.



- **Whenever changing the Backlight, be sure the GLC's power cord has been disconnected and that the unit is cooled down.**
- **When the GLC's power cord is connected and the GLC is ON, high voltage runs through the wires in the backlight area—do not touch them!**
- **When the GLC's power has just been turned OFF, the Backlight area is still very hot! Be sure to wear gloves to prevent being burned.**



- ***Be sure to change both backlights, i.e. the upper and the lower units.***
- ***Do not allow water, oil or handprints to be left on the tube, since they can all reduce the backlight's life.***

■ Items Required When Changing The GLC's Backlight

- ◆ Phillips type screwdriver (no.2) for GLC's rear cover attachment screws.
- ◆ Phillips type screwdriver (no.0) for backlight unit's metal cover.
- ◆ One pair of clean (preferably new) cotton gloves.

(Also, a small container for placing the attachment screws may help to prevent them from becoming lost or misplaced)

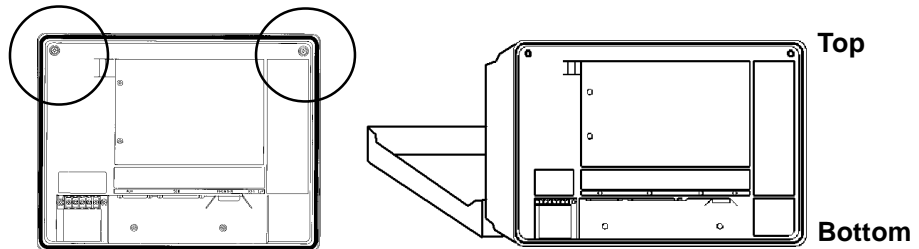
■ How to replace the GLC300's backlight

This unit has two backlights, one at the top and one at the bottom. The following explanation is for changing the top backlight. To change the bottom backlight, simply repeat the procedures shown here in the same order.

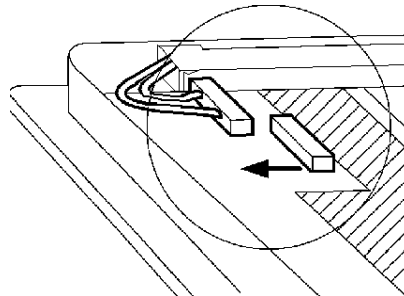


- **Be sure to change both backlights at the same time.**
- **The GLC300 backlight's CFL tube and housing are combined in one unit. Be sure to change only this combined unit.**

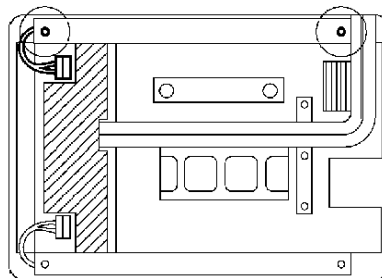
- 1) Turn the GLC's power OFF (i.e. disconnect the GLC's power cord).
- 2) Use a Phillips screwdriver to remove the case's two rear attachment screws, and pivot the rear cover open, starting from the top of the unit. (The cover is fastened at the bottom, and hinges open).



- The rear cover cannot be completely removed. If you attempt to remove it, you may break the cover.
- 3) Disconnect the upper backlight's power connector from the GLC's inverter.



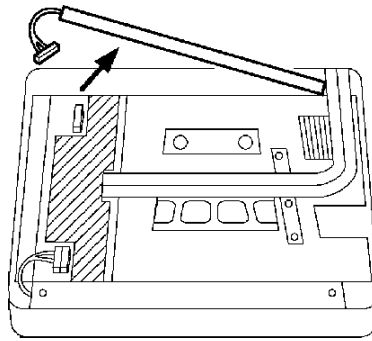
- 4) Loosen the backlight unit holder's two attachment screws, and remove the backlight unit's metal cover.



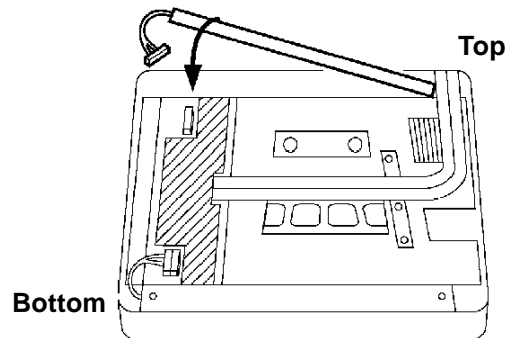
- Since the attachment screws are small, be sure not to lose them or allow them to fall inside the GLC's case.

Chapter 7 - Maintenance

- 5) Remove the old backlight unit.

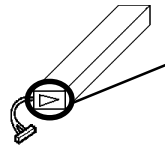


- 6) Insert the new backlight into the unit.



Important

The upper and lower backlight units are different.



The upper backlight unit can be distinguished by the arrow mark shown here.

- 7) Insert the backlight unit holder's three positioning tabs into the backlight's three positioning slots. Next, retighten the cover's two attachment screws.



- 8) Reattach the backlight unit's power connector.
9) Repeat these steps for the GLC's bottom backlight unit.
10) After both backlight units are changed and the power connectors reattached, close the rear case and reattach the case's two attachment screws.



Important

- **Be sure not to pinch or cut any of the GLC's internal wiring when closing the case.**
- **If the attachment screws are missing, check that they are not left inside the GLC's case. Turning the GLC's power ON while they are left inside the GLC may cause a malfunction.**
- **When the replacement of the backlight is finished, turn on the GLC and make sure that the screen display is correct. If the unit malfunctions, please contact your Pro-face dealer for service and advice.**



Note:



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