Pro-face
Human Machine Interface

Pro-face®

GP-4100 Series

Hardware Manual

Preface

Thank you for purchasing Pro-face's GP-4100 Series Programmable Operator Interface (Hereafter referred to as the "GP unit").

Before operating your GP unit, be sure to read this manual to familiarize yourself with the GP unit's operation procedures and features.

Essential Safety Precautions

All safety-related procedures stated in this document must be followed to operate the GP correctly and safely. Be sure to read this and any related documents thoroughly to understand the correct operation and functions of the GP unit.

Safety Icons

Throughout this manual, these icons provide essential safety information for GP operation procedures requiring special attention. These icons indicate the following levels of danger:

⚠ WARNING	Indicates situations where severe bodily injury, death or major equipment damage can occur.
⚠ CAUTION	Indicates situations where slight bodily injury or minor equipment damage can occur.
🚫	Indicates actions or procedures that should NOT be performed.
❗	Indicates actions or procedures that MUST be performed to ensure correct unit operation.

⚠ WARNING

System Design

🚫 Do not make switches using the switches on the touch panels which may cause operator injury and machine damage. An output may remain either ON or OFF and a major accident can occur. To prevent this, set up circuits such as limiters that will monitor vital output signals. Design switches for important operations to be performed by separate devices. An incorrect output or malfunction can occur and thereby cause an accident.

🚫 Do not create GP touch panel switches to control machine safety operations, such as an emergency stop switch. Install these switches as separate hardware switches, otherwise severe bodily injury or equipment damage can occur.

❗ Be sure to design your system so that a communication fault between the GP and its host controller will not cause equipment to malfunction. This is to prevent any possibility of bodily injury or equipment damage.

🚫 Do not use the GP as a warning device for critical alarms that can cause serious operator injury, machine damage or can halt system operation. Critical alarm indicators and their control/activator units must be designed using stand-alone hardware and/or mechanical interlocks.

🚫 Do not use the GP with aircraft control devices, aerospace equipment, central trunk data transmission (communication) devices, nuclear power control devices, or medical life support equipment, due to these devices' inherent requirements of extremely high levels of safety and reliability.

⊘ When using the GP with transportation vehicles (trains, cars, and ships), disaster and crime prevention devices, various types of safety equipment, and medical devices that are not life-support related, use redundant and/or failsafe system designs to ensure proper reliability and safety.

⊘ After the GP unit's backlight burns out the touch panel is still active, unlike the GP unit's "Standby Mode". If the operator fails to notice that the backlight is burned out and touches the panel, a potentially dangerous machine operation error can occur. Therefore, do not create GP unit touch panel switches that may cause injury and/or equipment damage. If your GP unit's backlight suddenly turns OFF, use the following steps to determine if the backlight is actually burned out.

1) If the GP unit's "Backlight Control" is not set and the screen has gone blank, your backlight is burned out.
2) If the GP unit's "Backlight Control" is set to Standby Mode and the screen has gone blank, and touching the screen or performing another input operation does not cause the display to reappear, your backlight is burned out.

Handling

⊘ Do not disassemble or modify the GP unit. Doing so may cause a fire or an electric shock.

⊘ Do not operate the GP in an environment where flammable gases are present, since it may cause an explosion.

Wiring

❶ To prevent electrical shock or equipment damage, unplug the GP unit's power cord from the power supply prior to installing or wiring the GP.

❶ To prevent an electric shock be sure to disconnect your GP unit's power cord from the power supply before wiring the GP.

⊘ Do not use voltage beyond the GP unit's specified range. Doing so may cause a fire or an electric shock.

❶ The cables connected to the GP should be secured by cable clamps to prevent weight or tension of the cables added to the connectors or terminals.

❶ The GP unit's wiring should be checked to confirm that both the operating voltage and wiring terminal locations are correct. If either the voltage or the wiring terminal location is incorrect, it can cause a fire or accident.

Maintenance

⊘ NEVER touch a live power terminal. Doing so could cause an electrical shock or a machine malfunction.

⊘ To prevent an electrical shock, unplug the GP unit's power cord before either cleaning the GP or attaching/detaching the power terminal attachment screws.

⊘ Do not connect or disconnect Host and GP unit communication cables while the GP is turned ON.

⚠ CAUTION

Wiring Layout Precautions

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

Installation

🛈 Be sure all cable connectors are securely attached to the GP unit. A loose connection may cause incorrect input or output signals.

Wiring

🛈 Be sure to ground the GP unit's FG wire separately from other equipment FG lines. Also, be sure to use a grounding resistance of 100. or less and a 2mm^2 [0.0062inch^2] or thicker wire, or your country's applicable standard. Otherwise, electric shock or malfunctions may result.

🛈 Be sure to use only the designated torque to tighten the GP unit's terminal block screws. If these screws are not tightened firmly, it may cause a short-circuit, fire or incorrect unit operation.

🛈 Be sure that metal particles and wiring debris do not fall inside the GP unit. They can cause a fire, malfunction or incorrect unit operation.

Unit Disposal

🛈 When the product is disposed of, it should be done so according to your country's regulations for similar types of industrial waste.

General Safety Precautions

🚫 Do not press on the GP unit's display with excessive force or with a hard object, since it can damage the display. Also, do not press on the touch panel with a pointed object, such as the tip of a mechanical pencil or a screwdriver, since doing so can damage the touch panel.

🚫 Do not install the GP where the ambient temperature exceeds the specified range. Doing so may cause a unit malfunction.

🚫 To prevent abnormally high temperatures from occurring inside the GP, do not restrict or block the GP unit's rear-face ventilation slots.

🚫 Do not operate the GP in areas where large, sudden temperature changes can occur. These changes can cause condensation to form inside the GP, possibly causing it to malfunction.

🚫 Do not allow water, liquids or metal fragments to enter inside the GP unit's case, since they can cause either a malfunction or an electric shock. The allowable pollution degree is 2.

$\bigcirc$ Do not operate or store the GP in locations where it can be exposed to direct sunlight, high temperatures, excessive dust, moisture or vibration.

$\bigcirc$ Do not operate or store the GP where chemicals evaporate, or where chemicals are present in the air.
Corrosive chemicals: Acids, alkalines, liquids containing salt
Flammable chemicals: Organic Solvents

$\bigcirc$ Do not use paint thinner or organic solvents to remove dirt or oil from the GP unit's surface. Instead, use a soft cloth moistened with a diluted neutral detergent.

$\bigcirc$ Do not use or store the GP in areas with direct sunlight, since the sun's ultraviolet rays may cause the LCD's quality to deteriorate.

❗ Do not store the GP in an area where the temperature is lower than that recommended in the GP unit's specifications. Doing so may cause the LCD display's liquid to congeal, which can damage the LCD. Also, if the storage area's temperature becomes higher than the specified level, the LCD's liquid may become isotropic, causing irreversible damage to the LCD. Therefore, only store the GP in areas where temperatures are within the GP unit's specifications.

❗ After turning OFF the GP, be sure to wait a few seconds before turning it ON again. The GP may not operate correctly if it is restarted too quickly.

❗ Be sure to back up the GP screen data in case they are lost accidentally.

LCD Panel Usage Precautions

- The LCD panel's liquid contains an irritant. If the panel is damaged and any of this liquid contacts your skin, immediately rinse the area with running water for at least 15 minutes. If the liquid gets in your eyes, immediately rinseyour eyes with running water for at least 15 minutes and consult a doctor.
- The GP unit's LCD screen may flicker or show unevenness in the brightness of certain images or at some contrast settings. This is an LCD characteristic and not a product defect.
- There's an individual difference in brightness and tone of LCD screen. Please be aware of this difference before using the lined-up plural units.
- Depending on the ambient temperature, LCD displays may sometimes look whitish (at high temperatures) or blackish (at low temperatures). This is an LCD characteristic and not a product defect.
- Some of GP unit's LCD screens may contain light or dark pixels. This is an LCD characteristic and not a product defect.
- Extended shadows, or "Crosstalk" may appear on the sides of screen images. This is an LCD characteristic and not a product defect.
- The color displayed on the GP unit's LCD screen may appear different when seen from outside the specified viewing angle. This is an LCD characteristic and not a product defect.

- When the same image is displayed on the GP unit's screen for a long period, an afterimage may appear when the image is changed. If this happens, turn off the GP, wait 10 seconds and then restart the unit. This is an LCD characteristic and not a product defect.
- To prevent an afterimage:

  * Set the GP unit's display OFF feature when you plan to display the same screen image for a long period of time.

  * Change the screen image periodically and try to not display the same image for a long period of time.
- Please be aware that characteristics of the GP unit's LCD screen with a white/red LED backlight may change gradually owing to the deterioration of the backlight LED. The white LCD display may look bluish when it turns on.

About the Manuals

For the detailed information on GP-4100 Series, refer to the following manuals.

- Maintenance/Troubleshooting

  For the Offline Settings, see Maintenance/Troubleshooting (Offline Settings Guide).
- GP-Pro EX Device/PLC Connection Manual
- GP-Pro EX Reference Manual

The manuals can be downloaded from Pro-face Home Page "Otasuke Pro!".

URL "Otasuke Pro!"

http://www.pro-face.com/otasuke/

Information Symbols

This manual uses the following icons:

IMPORTANT	Indicates a warning or a product limitation. Be sure to follow the instructions given with this icon to ensure the safe operation of the GP.
Screen Editor	Indicates the GP-Pro EX software.
PLC	Abbreviation for Programmable Logic Controller.
*	Indicates useful or important supplemental information.
NOTE	Contains additional or useful information.
SEE →	Indicates pages containing related information.

GP-4100 Series Model Name Indication

Model name

G P 4 <u>1</u> <u>0</u> <u>* *</u> 1 <u>D</u>
     A B C D   E
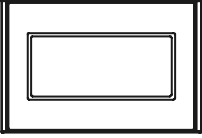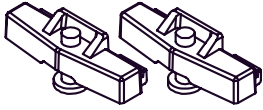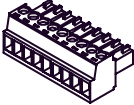
A	1	GP-4100 Series (3.4-inch, 200 x 80 dots)
B	0	Normal resolution
C	5	RS-232C type
	6	RS-422/485 type
	7	RS-485 (isolation) type
D	G	STN Monochrome Green/Orange/Red
	W	STN Monochrome White/Pink/Red
E	D	DC24V type power supply is used.

GP-4100 Series Model Names

Series		Names	Models
GP4000 Series	GP-4100 Series	GP-4105	GP4105G1D GP4105W1D
		GP-4106	GP4106G1D GP4106W1D
		GP-4107	GP4107G1D GP4107W1D

Package Contents

The following items are included in the GP unit's package. Before using the GP, please check that all items listed here are present.

GP Unit: 1	• English and Japanese Installation Guide (1) • Warning/Caution Information (1)	Installation Gasket: 1 (Attached to the GP unit)	Installation Fasteners: Set of 2
COM I/F Connector (1) (For RS-232C and RS-422/485 types) (Attached to the GP unit)			

This unit has been carefully packed, with special attention to quality. However, should you find anything damaged or missing, please contact your local GP distributor immediately.

UL/c-UL Approval

The following units are UL/c-UL listed products. (UL File No.E220851)

Product Model No.	UL/c-UL Registration Model No.
GP4105G1D	3910017-01
GP4105W1D	3910017-02
GP4106G1D	3910017-03
GP4106W1D	3910017-04

This product conforms to the following standards:

• UL508   Industrial Control Equipment

• CSA-C22.2 No.142-M1987   (c-UL Approval)

                          Process Control Equipment

<Cautions>

Be aware of the following items when building the GP into an end-use product:

• For use on a flat surface of a Type 4X (Indoor Use Only) and/or Type 13 Enclosure.

CE Marking

The following units are CE marked products complying with the EMC Directive.

They comply with EN61000-6-2, EN61000-6-4. and EN61131-2

GP4105G1D	GP4105W1D
GP4106G1D	GP4106W1D
GP4107G1D	GP4107W1D

About Revision

The nameplate on the GP has the revision number of the GP. In the example below, the asterisk, which is placed at the "A" position, shows that the revision number is "A".

Contents

Chapter 1 Accessories/System Design

Chapter 2 Part Names and Functions

Chapter 3 Specifications

Chapter 4 Installation and Wiring

Chapter 5 Maintenance

1 | Accessories/ System Design

1. Accessories
2. System design

1.1 Accessories

All accessories listed here are produced by Pro-face.

1.1.1 Serial Interface Item

Product Name	Model No.	Description
Mitsubishi PLC A-Series Cable (5 m)	ZC9CBA51	Connects the GP directly to the CPU programming port on the Mitsubishi Electric PLC A/QnA series. (3.4 inch)
Mitsubishi PLC Q-Series CPU I/F Cable (3 m)	ZC9CBQ31	Connects the GP directly to the CPU programming port on the Mitsubishi Electric PLC Q series. (3.4 inch)
Mitsubishi PLC FX-Series CPU I/F Cable (1 m)	ZC9CBFX11	Connect the GP directly to the CPU programming port on the Mitsubishi Electric PLC FX series. (3.4 inch)
Mitsubishi PLC FX-Series CPU I/F Cable (5 m)	ZC9CBFX51	
Panasonic Electric Works PLC FP Series CPU Cable (2 m)	ZC9CBFP21	Connects the GP directly to the CPU port on the Panasonic Electric Works PLC FP series. (3.4 inch)

1.1.2 USB (Type A) Interface

Product Name	Model No.	Description
USB Panel-mount Extension Cable (USB Type A) (1 m)	CA5-USBEXT-01	Extension cable attaching to the USB (Type A) port on the front side of the operation panel.
USB-Serial (RS-232C) Conversion Cable (0.5 m)	CA6-USB232-01	Cable for converting a GP unit's USB interface (Type A) into a serial interface (RS-232C). Only available for communication using the Screen Creation Software's Expanded SIO Feature.

1.1.3 USB (mini-B) Interface

Product Name	Model No.	Description
USB Transfer Cable (USB A/mini-B) (1.8 m)	ZC9USCBMB1	Cable for transferring screen data from a PC (USB A) to the GP (USB mini-B).
USB Panel-mount Extension Cable (USB mini-B) (1 m)	ZC9USEXMB1	Extension cable attaching to the USB (mini-B) port on the front side of the operation panel.

1.1.4 Option Items

Product Name	Model No.	Description
3.4-inch Screen Protection Sheet	ZC9DS31	Disposable, dirt-resistant sheet for the GP unit's screen. (5 sheets/set) (Hard type)

1.1.5   Maintenance Items

Product Name	Model No.	Description
3.4-inch Installation Fastener	ZC9AF31	Used to install the GP into a solid panel. (2 pieces/set)
3.4-inch Installation Gasket	ZC9WG31	Provides dust and moisture resistance when GP is installed into a solid panel. (1 gasket)
USB Clamp Type A (1 port)	ZC9USCL1	USB (Type A) Cable clamp for 1 port products to prevent disconnection. (5 clamps/set)
USB Clamp Type mini-B (1port)	ZC9USCLMB1	USB (mini-B) Cable clamp for 1 port products to prevent disconnection. (5 clamps/set)
3.4-inch COM I/F Connector	ZC9CMC1	Connector for Serial I/F (3.4-inch, 1 connector)

1.2 System design

The following diagram illustrates the standard range of items that can be connected to GP-4100 Series units.

For host controller (PLC, etc.) connection information, refer to the "GP-Pro EX Device/PLC Connection Manual".

1.2.1 GP RUN Mode Peripherals

■Serial Communication

GP-4100 Series

IMPORTANT

For instructions on how to connect to other devices,
always refer to the "GP-Pro EX Device/PLC Connection Manual".

RS-232C Port

RS-422/485 Port

RS-485 (isolation) Port

Serial Interface
(COM1)

■ Mitsubishi PLC Q Series CPU I/F Cable
ZC9CBQ31
■ Panasonic Electoric Works PLC FP Series CPU Cable
ZC9CBFP21
■ RS-232C Cable
(Prepared by user)   RS-232C type

■ Mitsubishi PLC A Series Cable
ZC9CBA51
■ Mitsubishi PLC FX Series CPU I/F Cable
ZC9CBFX51
ZC9CBFX11
■ RS-422 Cable
(Prepared by user)   RS-422/485 type

■ PROFIBUS Cable
(Prepared by user)

RS-485(isolation) type

Programming
Console Port

Host Controller
PLC etc.

■ RS-232C Cable
(Prepared by user)
+
■ Siemens TTY Converter Cable
CA6-CBLTTY/5M-01   RS-232C type

Programming
Console Port

■ RS-422 Cable
(Prepared by user)
+
■ Mitsubishi PLC A, QnA, FX Series's Port Adapter II
GP070-MD11
RS-422/485 type

■USB (Type A)/ USB (mini-B) Interface

GP-4100 Series
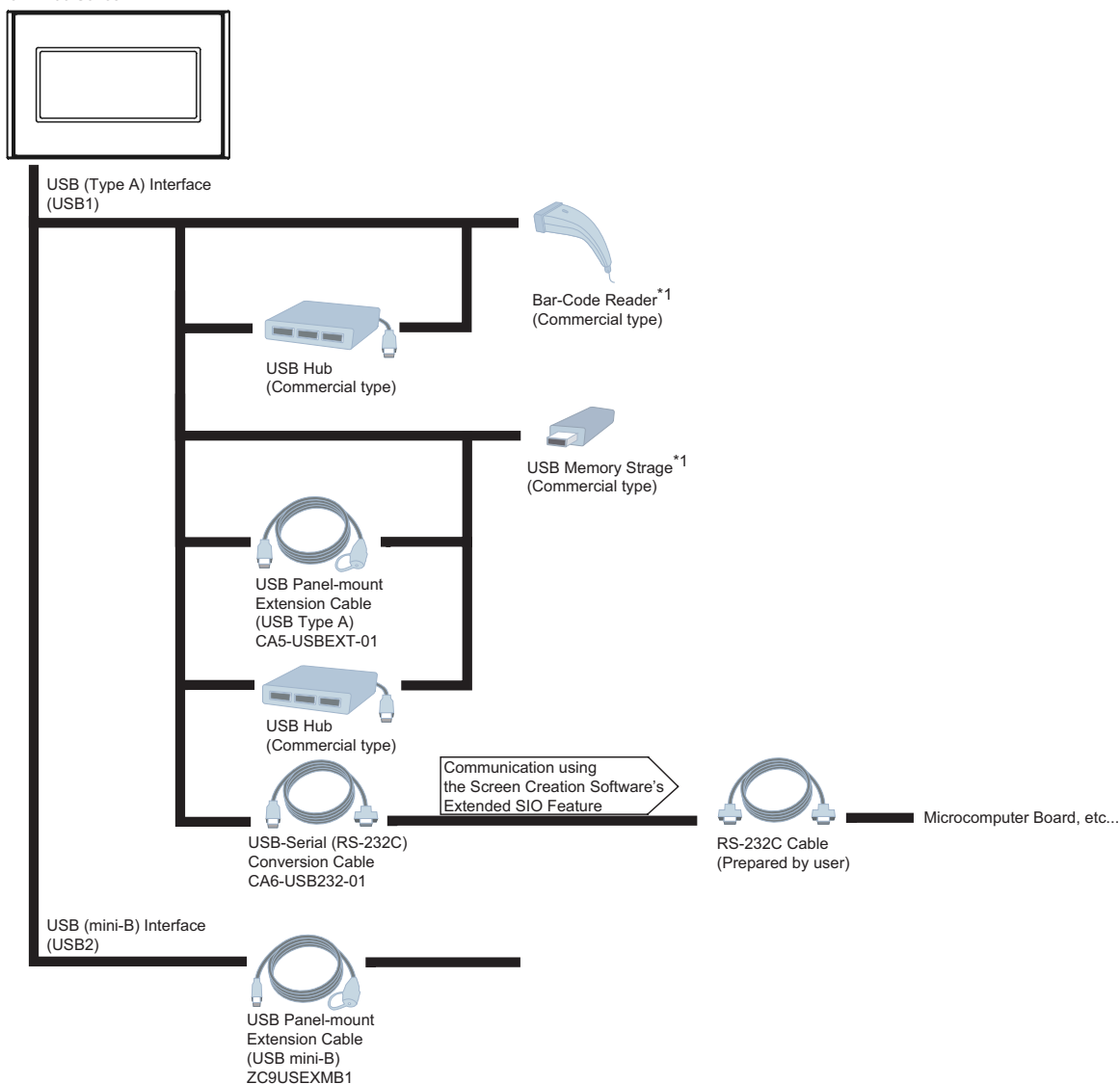
USB (Type A) Interface
(USB1)

Bar-Code Reader[1]
(Commercial type)

USB Hub
(Commercial type)

USB Memory Strage[1]
(Commercial type)

USB Panel-mount
Extension Cable
(USB Type A)
CA5-USBEXT-01

USB Hub
(Commercial type)

Communication using
the Screen Creation Software's
Extended SIO Feature

Microcomputer Board, etc...

USB-Serial (RS-232C)
Conversion Cable
CA6-USB232-01

RS-232C Cable
(Prepared by user)

USB (mini-B) Interface
(USB2)

USB Panel-mount
Extension Cable
(USB mini-B)
ZC9USEXMB1

[1]
For supported models, refer to Pro-face's support site "Otasuke Pro!"
 (http://www.pro-face.com/otasuke/).
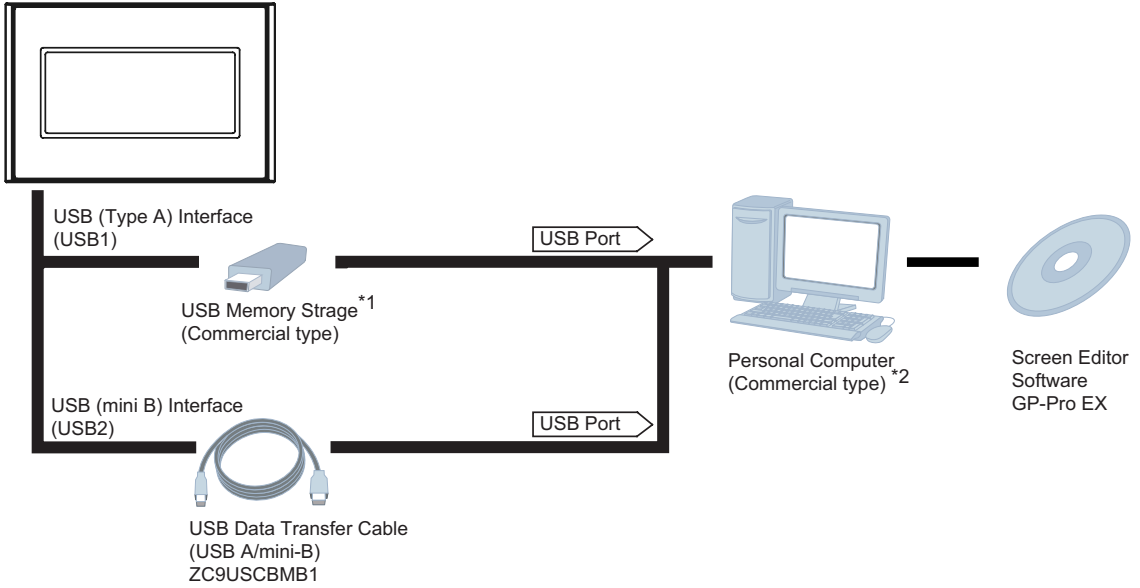You can connect to this site by clicking the GP-Pro EX's [Help (H)] menu-
[Connect to Support Site "Otasuke Pro!" (C)] command.

IMPORTANT
• If connecting a bar code reader to the GP, be sure to supply power from an external

source (such as a self-powered hub). If you supply power from the GP, the GP may

reset itself because the GP cannot supply enough power.

1.2.2   Edit Mode Peripherals

GP-4100 Series

USB (Type A) Interface
(USB1)

USB Port

USB Memory Strage[1]
(Commercial type)

USB (mini B) Interface
(USB2)

USB Port

Personal Computer
(Commercial type) [2]

Screen Editor
Software
GP-Pro EX

USB Data Transfer Cable
(USB A/mini-B)
ZC9USCBMB1

[1]
For supported models, refer to Pro-face's support site
"Otasuke Pro!" (http://www.pro-face.com/otasuke/).
You can connect to this site by clicking the GP-Pro EX's [Help (H)] menu-
[Connect to Support Site"Otasuke Pro!" (C)] command.

[2]
Certain types and models of PCs cannot be used.
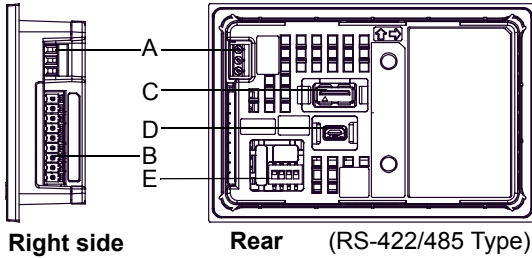Please refere to GP-Pro EX Reference Manual.
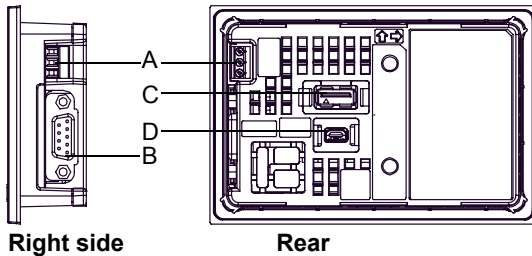
2 | Part Names and Functions

1. GP-4100 Series

This chapter describes the GP's part name and functions of each part.

2.1 GP-4100 Series

RS-232C and RS-422/485 Types (GP-4105, and GP-4106)

Right side   **Rear**   (RS-422/485 Type)

RS-485 (isolation) Type (GP-4107)

Right side   **Rear**

A: Power Connector

B: Serial Interface (COM1)
RS-232C and RS-422/485 Types: 9-pin, 2-piece terminal block
RS-485(isolation) Type: D-Sub 9 pin (socket)

C: USB (Type A) Interface (USB1)
Complies with USB 2.0, Uses a "TYPE-A" connector. Power supply voltage: DC5±5%,
The maximum communication distance: 5 m.

| IMPORTANT | • If connecting a bar code reader to the GP, be sure to supply power from an external source (such as a self-powered hub). If you supply power from the GP, the GP may reset itself because the GP cannot supply enough power. |

D: USB (mini-B) Interface (USB2)
Conforms to USB2.0 (mini-B) x 1
Communication Distance: 5 m or less

E: DIP Switch (SW1)
A terminating resistor can be inserted using the DIP Switch (4-bit) on the rear of the RS-422/485 type. Factory default settings are all set to "OFF" (no terminating resistor).

| NOTE | • Check the terminating resistor required for connection to the connected device (PLC) and install if necessary. For detailed information, refer to the GP-Pro EX Device/PLC Connection Manual. |

3 | Specifications

1. GP-4100 Series

This chapter describes the general, functional and interface specifications of the GP as well as its dimensions.

3.1 GP-4100 Series

3.1.1 General Specifications

■Electrical Specifications

			GP4105	GP4106	GP4107
Power Supply	Input Voltage		DC 24 V		
	Rated Voltage		DC 19.2 to 28.8 V		
	Allowable Voltage Drop		3 ms or less		
	Power Consumption	When power is not supplied to USB devices	2.7 W or less	3.0 W or less	3.4 W or less
		When power is supplied to USB devices	6.0 W or less	6.2 W or less	6.5 W or less
	In-Rush Current		30 A or less		
Voltage Endurance			AC 1,000 V, 20 mA for 1 min (between charging and FG terminals)		
Insulation Resistance			DC 500 V, 10MΩ or more (between charging and FG terminals)		

■Environmental Specifications

Physical	Surrounding Air Temperature	0 to 50°C[*1]
	Storage Temperature	-20 to +60°C
	Ambient Humidity	10 to 90 % RH (Wet bulb temperature: 39°C or less - no condensation.)
	Storage Humidity	10 to 90 % RH (Wet bulb temperature: 39°C or less - no condensation.)
	Dust	0.1 mg/m^3 or less (non-conductive levels)
	Pollution Degree	For use in Pollution Degree 2 environment
	Atmosphere	Free of corrosive gases
	Air Pressure Vibration Resistance (altitude range)	800 to 1,114 hPa (2,000 m above sea level or less)
Mechanical	Vibration Resistance	IEC/EN61131-2 compliant 5 to 9 Hz Single amplitude 3.5 mm [0.14 in.] 9 to 150 Hz Fixed acceleration: 9.8 m/s^2 X, Y, Z directions for 10 cycles (100 min)
	Concussion Resistance	IEC/EN61131-2 compliant 147 m/s^2, X, Y, Z directions for 3 times

Electrical	Noise Immunity	Noise Voltage: 1,000 Vp-p Pulse Duration: 1 µs Rise Time: 1 ns, (via noise simulator)
	Noise Immunity (Fast Transient Burst Noise)	Power Line: 2 kV (IEC/EN61000-4-4) COM Port: 1 kV (IEC/EN61000-4-4)
	Electrostatic Discharge Immunity	Contact Discharge Method: 6 kV/Air Discharge Method: 8 kV (IEC/EN61000-4-2 Level 3)

*1   When using in an environment where the temperature becomes or exceeds 40°C for an extended period of time, the screen contrast level may decrease from its original level of brightness.

■Structural Specifications

Installation	Grounding	Functional grounding:Grounding resistance of 100Ω, 2mm^2 or thicker wire, or your country's applicable standard. (Same for FG and SG terminals)
	Structure[*1]	IP65f NEMA #250 TYPE 4X/13 (on the front panel when properly installed in an enclosure)
	Installation Configuration	Embedded panel
	Cooling Method	Natural air circulation
	Weight Approx.	0.2 kg [0.4 lb] or less (display unit only)
	External Dimensions	W116.5 x H77.5 x D28 mm [W4.59 x H3.05 x D1.1 in.]
	Panel Cut Dimensions	W105 x H66 mm [W6.14 x H4.86 in.][*2] Panel thickness area: 1 to 5 mm [0.04 to 0.2 in.][*3]

*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, be sure to replace the installation gasket regularly.

*2   Regarding dimensional tolerance, everything +1/-0 mm [+0.04/-0 in.] and R in angle are below R3 [R0.12 in.].

*3   Even if panel thickness is within recommend range for "Panel Cut Dimensions", the panel could warp, depending on panel's material, size, and installation location of GP or other devices. To prevent panel warpage, the installation surface may need to be strengthened.

3.1.2 Performance Specifications

■Performance Specifications

		GP4105	GP4106	GP4107
Application Memory[*1]		FLASH EPROM 2.2 MB (Stores the Alarm History Data, Recipe Data, and Brightness/Contrast Control Settings)		
Data Backup		Not available		
Clock Accuracy		Uses the clock of an external device		
Interface	Serial (COM1)	RS-232C Asynchronous Transmission Data Length: 7 or 8 bit Parity: none, Odd or Even Stop Bit: 1 or 2 bit Data Transmission Speed: 2,400 bps to 115.2 kbps Connector: 2-piece terminal block 9 pin	RS-422/485, Asynchronous Transmission Data Length: 7 or 8 bit Parity: none, Odd or Even Stop Bit: 1 or 2 bit Data Transmission Speed: 2,400 bps to 115.2 kbps Connector: 2-piece terminal block 9 pin	RS-485 (isolation) Asynchronous Transmission Data Length: 7 or 8 bit Parity: none, Odd or Even Stop Bit: 1 or 2 bit Data Transmission Speed: 2,400 bps to 115.2 kbps, 187.5 kbps (MPI) Connector: D-Sub9 (socket)
	USB (Type-A)[*2]	Conforms to USB2.0 (TYPE-A) x 1 Power Supply Voltage: DC5V ±5% Communication Distance: 5 m or less		
	USB (mini-B)	Conforms to USB2.0 (mini-B) x 1 Communication Distance: 5 m or less		

*1   Capacity available for user application.

*2   If connecting a bar code reader to the GP, be sure to supply power from an external source (such as a self-powered hub). If you supply power from the GP, the GP may reset itself because the GP cannot supply enough power.

■Display Specifications

	GP4105G/4106G/4107G	GP4105W/4106W/4107W
Display Type	STN Monochrome LCD	
Display Size	3.4"	
Resolution	200 x 80 pixels	
Dot pitch	W0.4 x H0.4 mm [W0.02 x H0.02 in.]	
Effective Display Area	79.985 x 31.985 mm	
Display Colors	Monochrome Green/Red/Orange (16 Levels)	Monochrome White/Red/Pink (16 Levels)
Backlight[*1]	Green/Red LED (User nonreplaceable parts. Factory replacement required.)	White/Red LED (User nonreplaceable parts. Factory replacement required.)
Brightness Control	16 Levels (Adjusted with the touch panel)	
Contrast Control	8 Levels (Adjusted with the touch panel)	
Backlight Service Life	Green: 50,000 hrs. or more, Red 10,000 hrs. or more (each in continuous operation at 25°C before backlight brightness decreases to 50%)	White: 50,000 hrs. or more, Red 10,000 hrs. or more (each in continuous operation at 25°C before backlight brightness decreases to 50%)
Language Fonts[*2]	Japanese, ASCII, Chinese (Simplified), Chinese (Traditional), Korean, Cyrillic, Thai	
Character Sizes	Standard font: 8 x 8, 8 x 16, 16 x 16 and 32 x 32 pixel fonts Stroke font: 6 to 80 pixel fonts Image font: 8 to 72 pixel fonts	
Font Sizes	Standard font: Width can be expanded up to 8 times. Height can be expanded up to 8 times.[*3]	
Text 8 X 16 pixels	25 char. x 5 rows	
Text 16 X 16 pixels	12 char. x 5 rows	
Text 32 X 32 pixels	6 char. x 2 rows	

*1   The backlight burnout detection function is not supported.

*2   Please refer to the GP-Pro EX Reference Manual for details on font types and character codes.

*3   Other font sizes can be set up with the Editor software.

■Touch Panel Specifications

Touch Panel Type	Resistive Film (analog)
Touch Panel Resolution	1,024 x 1,024
Touch Panel Service Life	1,000,000 times or more

3.1.3   Serial Interface

IMPORTANT
- For instructions on how to connect to other devices, always refer to the "GP-Pro EX Device/PLC Connection Manual".
- The serial interface of the RS-232C and RS-422/485 types is not isolated. Always connect the SG (Signal Ground) of the GP unit to the connected device, especially if the connected device is also not isolated. Failure to do so may damage the RS-232C/RS-422/RS-485 circuit.
- An SG (Signal Ground) and FG (Frame Ground) are connected internally in the RS-232C and RS-422/485 types. When connecting an external device to the GP using the SG terminal, be sure to check that no short-circuit loop is created when you setup the system.

■ RS-232C and RS-422/485 Types (GP4105/GP4106)

Included COM I/F connector

(9-pin, 2-piece terminal block)

RS-232C type				RS-422/485 type			
Label	Signal Name	Direction	Meaning	Label	Signal Name	Direction	Meaning
CI	CI(RI)	Input	Called status display	CSB	CSB	Input	Send Possible B (-)
CD	CD	Input	Carrier Detect	CSA	CSA	Input	Send Possible A (+)
CS	CS(CTS)	Input	Send Possible	ERB	ERB	Output	Data Terminal Ready B (-)
RS	RS(RTS)	Output	Request to Send	ERA	ERA	Output	Data Terminal Ready A (+)
SG	SG	–	Signal Ground	SG	SG	–	Signal Ground
DR	DR(DSR)	Input	Data Set Ready	RDB	RDB	Input	Receive Data B (-)
ER	ER(DTR)	Output	Data Terminal Ready	RDA	RDA	Input	Receive Data A (+)
RD	RD(RXD)	Input	Receive Data	SDB	SDB	Output	Send Data B (-)
SD	SD(TXD)	Output	Send Data	SDA	SDA	Output	Send Data A (+)

NOTE
- A terminating resistor can be inserted using the DIP Switch (4-bit) on the rear of the RS-422/485 type. Factory default settings are all set to "OFF" (no terminating resistor). Check the terminating resistor required for connection to the connected device (PLC) and install if necessary. For detailed information, refer to the GP-Pro EX Device/PLC Connection Manual.

◆Communications Cable Specifications

| Communications Cable Diameter[*1]	0.14 to 1.5mm^2 (28 - 16 AWG)
Conductor Type	Simple or Stranded Wire[*2]
Conductor Length	7 mm [0.28 in]

*1 When inserting two wires into one terminal connector, the simple wire diameter is 0.08 to 0.5mm^2 (28 - 22 AWG), and the stranded wire diameter is 0.08 to 0.75mm^2 (28 - 20 AWG).

*2 If the Conductor's end (individual) wires are not twisted correctly, the end wires may either short against each other, or against an electrode.

◆Wiring the COM Interface Connector

IMPORTANT • Always ensure that the connector has been removed from the GP unit before wiring the connector. Failure to do so may result in electric shock.

(1) Remove the COM I/F connector from the GP.

(2) Use a flat-blade screwdriver (Size 0.4 x 2.5) to loosen the terminal screws.

(3) Strip the communications cable, and attach it to the terminal connector.
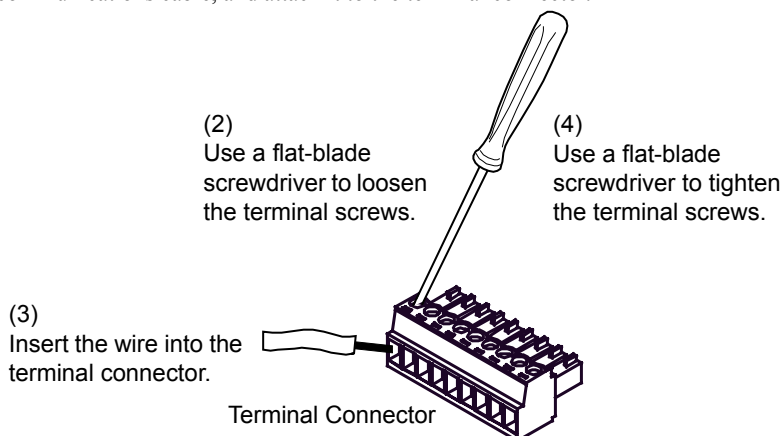
(2)
Use a flat-blade screwdriver to loosen the terminal screws.

(4)
Use a flat-blade screwdriver to tighten the terminal screws.

(3)
Insert the wire into the terminal connector.

Terminal Connector

(4) Use a flat-blade screwdriver to tighten the appropriate terminal screws on the terminal connector from step 3.

IMPORTANT • The torque required to tighten these screws is 0.196N•m.
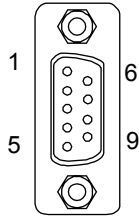
(5) Insert the connector into the GP unit's serial interface.

■ RS-485 (isolation) type (GP4107)

<GP unit side>

Interfit Bracket	#4-40 inch screws are used.

D-Sub 9-pin socket type connector

Pin Connection	RS-485 (isolation) type			
	PIN #	Signal Name	Direction	Meaning
	1	NC	–	–
	2	NC	–	–
	3	LINE(+)	Input/ Output	LINE(+)
	4	RS(RTS)	Output	Request to Send
	5	SG[*1]	–	Signal Ground
	6	5V[*2 *3]	–	5V External Output
	7	NC	–	–
(GP unit side)	8	LINE(-)	Input/ Output	LINE(-)
	9	NC	–	–
	Shell	FG[*1]	–	Frame Ground (Common with SG)

*1   The SG and FG terminals are isolated.

*2   When providing power of terminating resistor via the Siemens Co.'s PROFIBUS, power cannot be connected to the Device/PLC.

*3   The 5V output for Pin # 6 is not protected against overcurrent.

3.1.4　Dimensions

The following dimensions apply to all GP-4100 Series units.

■External Dimensions

The figure shows the RS-422/485 type, but all dimensions are common with the GP-4100 Series.

Unit: mm[in.]

Top

104.5[4.11]

116.5[4.59]　　　　4.5[0.18]　　28[1.10]

77.5[3.05]

65.5[2.58]

Front　　　　　　　**Side**
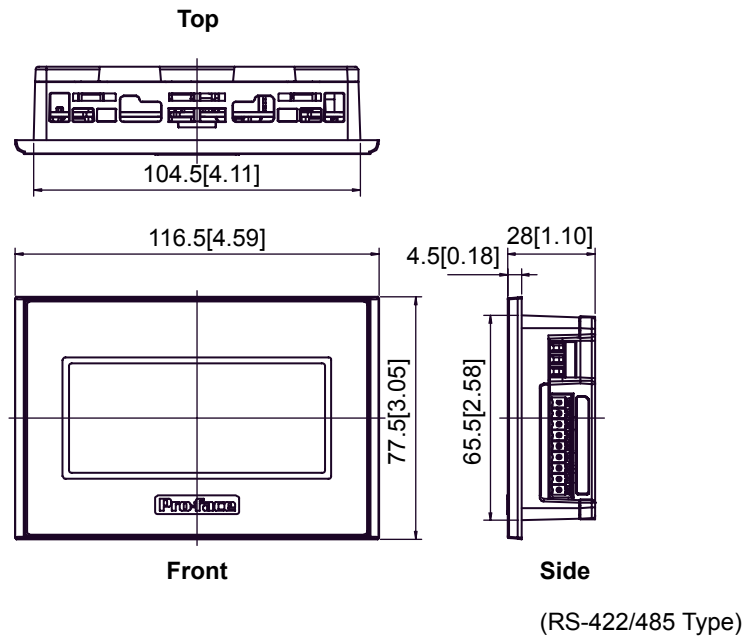
(RS-422/485 Type)

■Installation Fasteners Attached Dimensions

The figure shows the RS-422/485 type, but all dimensions are common with the GP-4100 Series.

Unit: mm[in.]

Top

104.5[4.11]

116.5[4.59]

4.5[0.18]

28[1.10]

77.5[3.05]

65.5[2.58]

90[3.54]

Left side   **Front**   **Right side**

Bottom   (RS-422/485 Type)
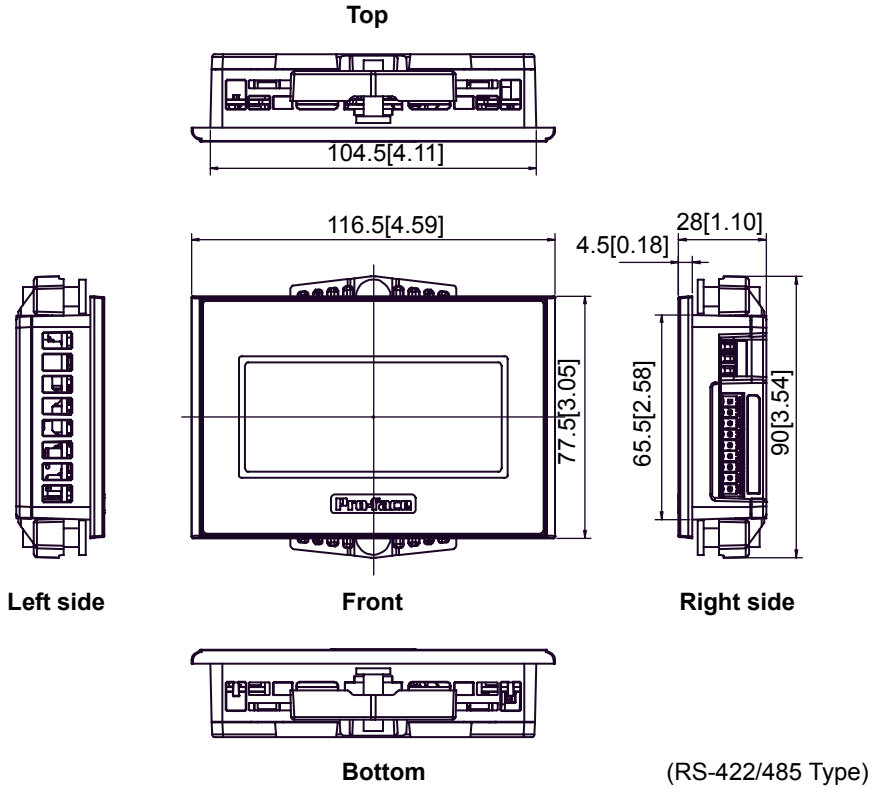
■ Cable Attached Dimensions

◆RS-232C and RS-422/485 Types

Unit: mm[in.]
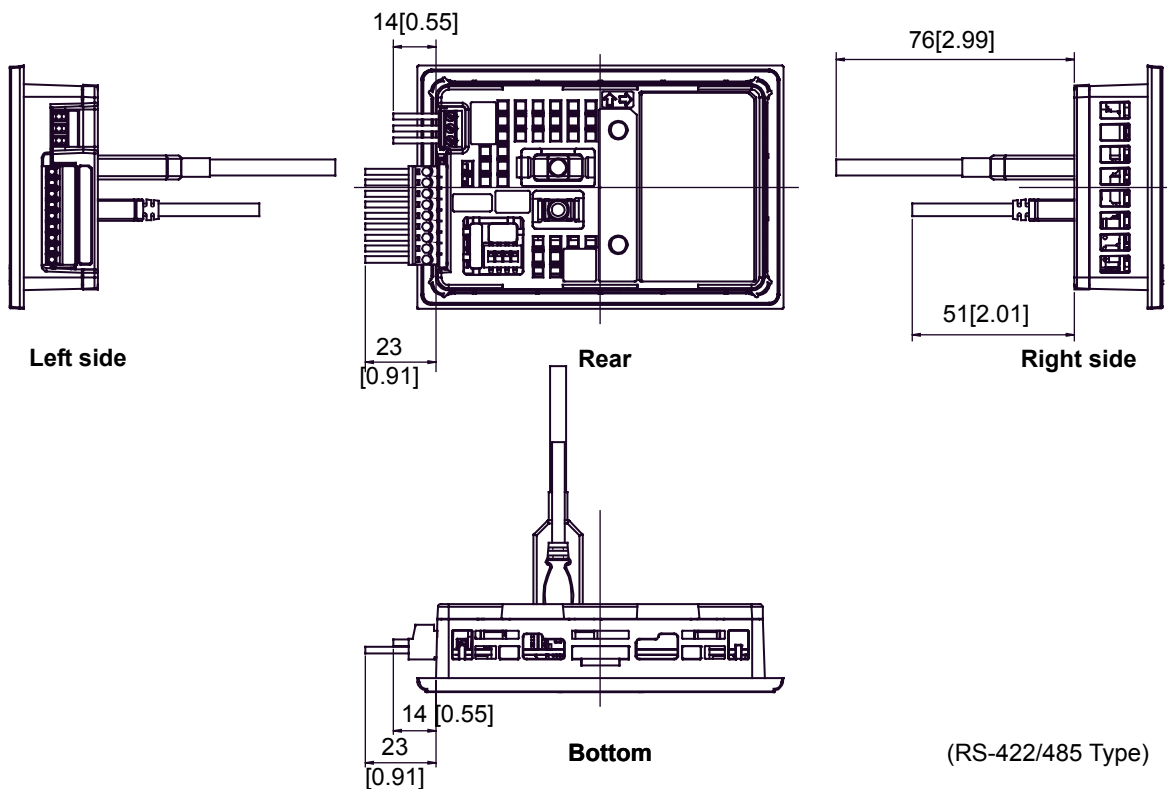
14[0.55]

76[2.99]

Left side

23
[0.91]

Rear

51[2.01]

Right side

14 [0.55]

23
[0.91]

Bottom

(RS-422/485 Type)

| IMPORTANT | • All the above values are designed in case of cable bending. The dimensions given here are representative values depending on the type of connection cable used. Therefore, they are all intended for reference only. |

◆ RS-485 (isolation) Type

Unit: mm[in.]
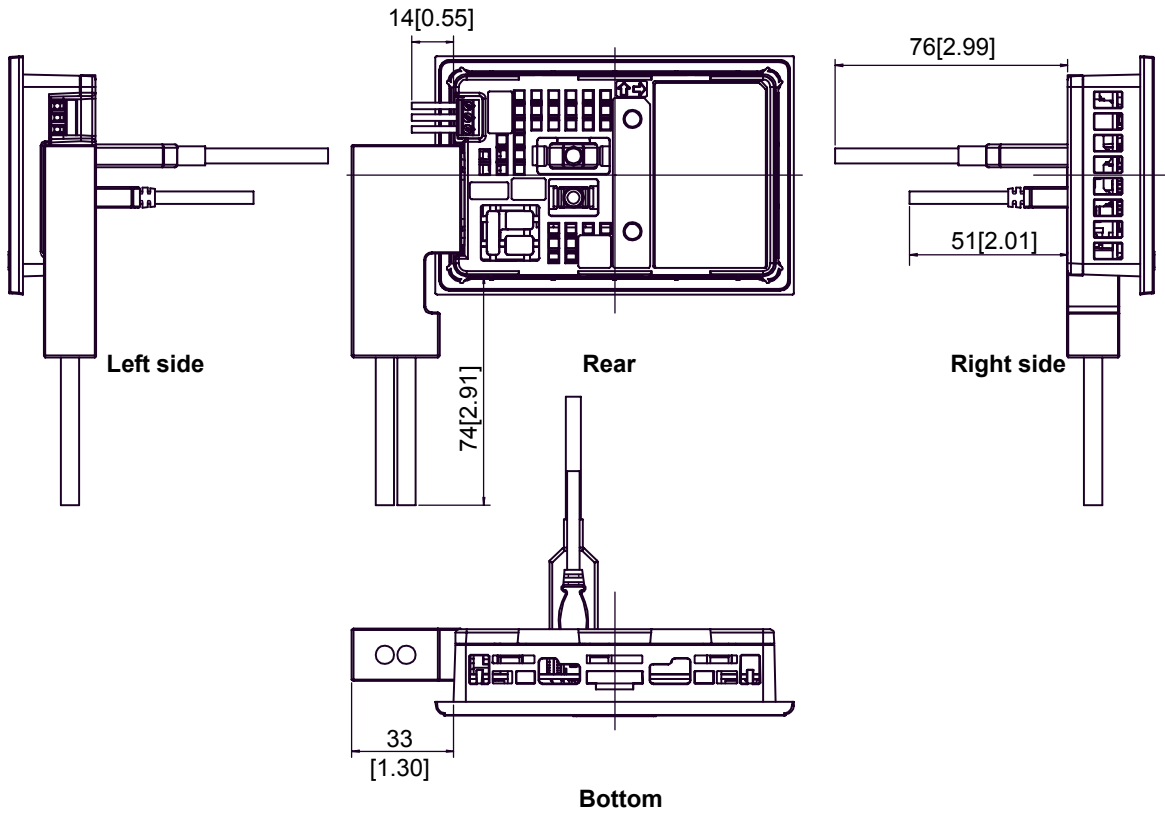
14[0.55]

76[2.99]

51[2.01]

74[2.91]

Left side　　　　**Rear**　　　　**Right side**

33
[1.30]

Bottom

IMPORTANT ・ All the above values are designed in case of cable bending. The dimensions given here are representative values depending on the type of connection cable used. Therefore, they are all intended for reference only.

■Panel Cut Dimensions

Unit: mm[in.]

$105.0 \, {}^{+1}_{-0}$ $[4.13 \, {}^{+0.04}_{-0}]$

r ≤ 3 [0.12]

$66.0 \, {}^{+1}_{-0}$ $[2.60 \, {}^{+0.04}_{-0}]$

Panel thickness area
1.0[0.04] to 5.0[0.20]
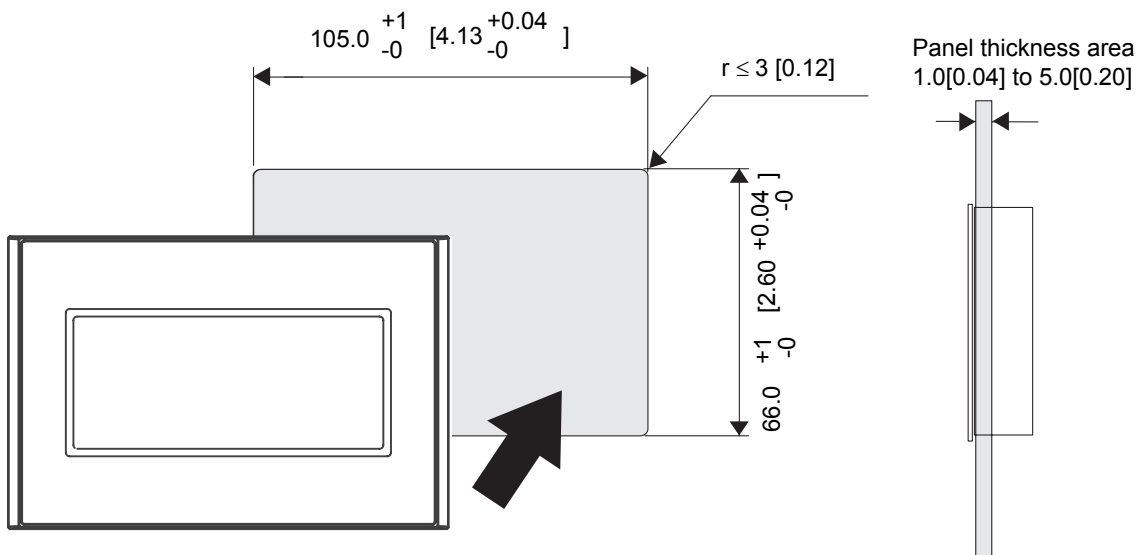
| NOTE | • Please read "4.1 Installation" before designing the Panel Cut. |

■Installation Fasteners

Unit: mm[in.]
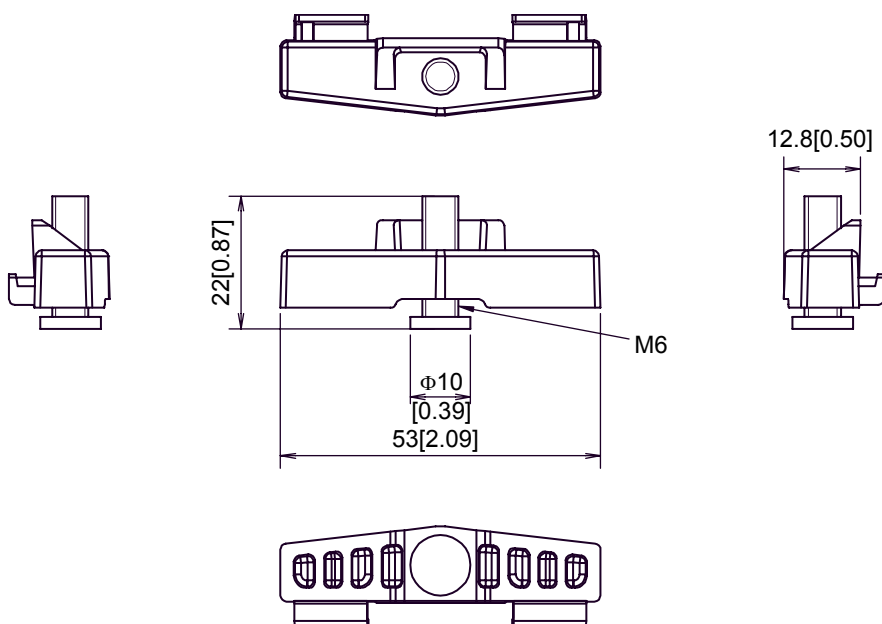
12.8[0.50]

22[0.87]

M6

Φ10
[0.39]

53[2.09]

4 | Installation and Wiring

4.1　Installation

This section describes the procedures and precautions for installing the GP Series units.

■Check the Installation Gasket's Seating

It is strongly recommended that you use the installation gasket, since it absorbs vibration in addition to repelling water.

For the procedure for attaching the installation gasket, refer to "5.3 Replacing the Installation Gasket".

$\boxed{\text{SEE} \rightarrow}$　*5.3 Replacing the Installation Gasket (page 5-4)*

$\boxed{\text{IMPORTANT}}$ • Before installing the GP into a cabinet or panel, check that the installation gasket is securely attached to the unit.

　　　　　　　　• 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 dust and drip resistance. Be sure to change the gasket periodically (or when scratches or dirt become visible).

■Creating a Panel Cut

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

Decide the panel's thickness based on the level of panel strength required.

$\boxed{\text{SEE} \rightarrow}$　*■Panel Cut Dimensions (page 3-13)*

$\boxed{\text{NOTE}}$ • Check that the installation panel or cabinet's surface is flat, in good condition and has no jagged edges.

　　　　　• Even if panel thickness is within recommend range for "Panel Cut Dimensions", the panel could warp, depending on panel's material, size, and installation location of GP or other devices. To prevent panel warpage, the installation surface may need to be strengthened.

■Installation Requirements

- For easier maintenance, operation, and improved ventilation, be sure to install the GP at least 100 mm [3.94 in.] away from adjacent structures and otherequipment.

Unit: mm[in.]
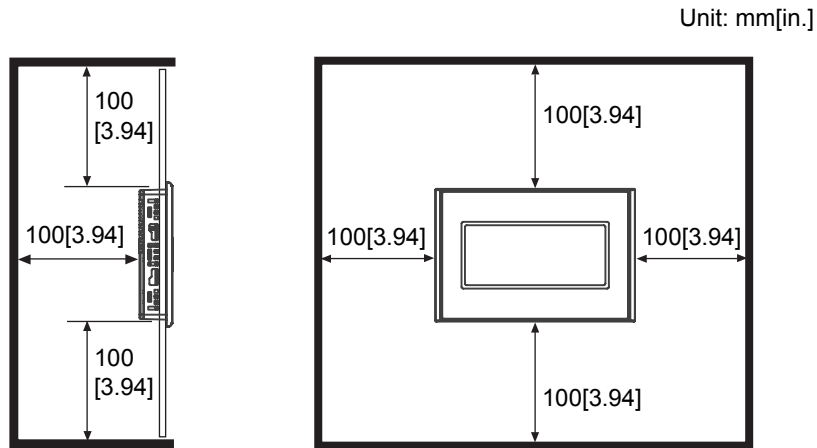
- Be sure that the surrounding air temperature and the ambient humidity are within their designated ranges. (Surrounding air temperature: 0 to 50°C, Ambient humidity: 10 to 90%RH, Wet bulb temperature: 39°C max.) When installing the GP on the panel of a cabinet or enclosure, "Surrounding air temperature" indicates both the panel face and cabinet or enclosure's internal temperature.
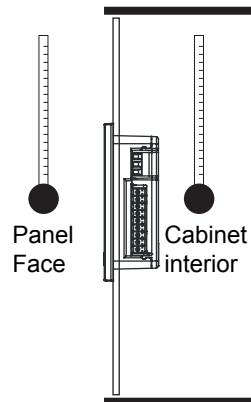
- Be sure that heat from surrounding equipment does not cause the GP to exceed its standard operating temperature.

- When installing the GP in a slanted panel, the panel face should not incline more than 30°.

30° or less
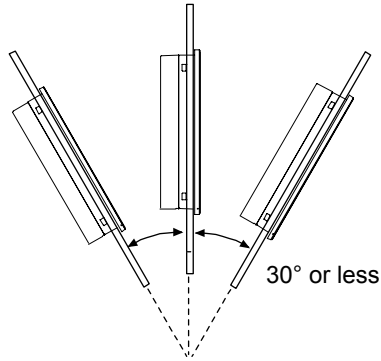
- When installing the GP in a slanted panel, and the panel face inclines more than 30°, the ambient temperature must not exceed 40°C. You may need to use forced air cooling (fan, A/C) to ensure the ambient operating temperature is 40°C or below.
- When mounting the GP unit vertically, ensure that the left side of the unit faces up (i.e. the power connector and serial interface should be at the bottom).

Mounted
Horizontally

Front and Rear Views
when Mounted Vertically

(RS-422/485 Type)
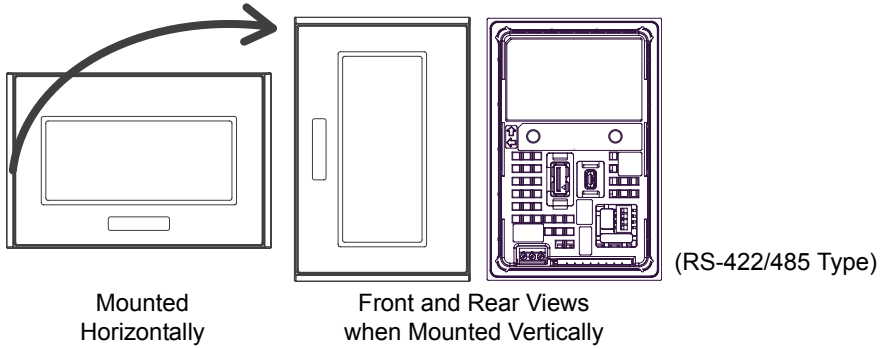
■Installing the GP

(1)   Insert the GP into the panel cut, as shown.
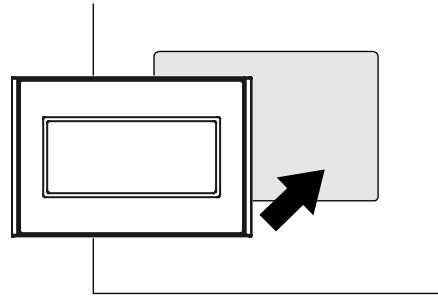
(2)   Insert the installation fastener hooks to the insertion slots on the GP unit.
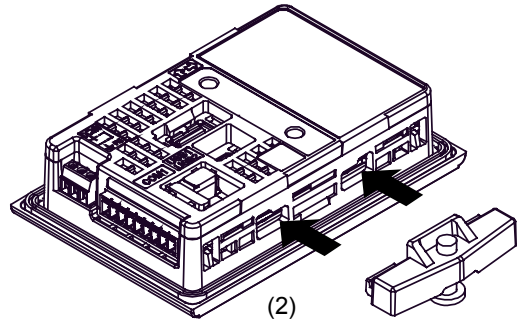
(2)
Insert the hooks to the insertion slots.

(3)   Tighten the installation fasteners with a screwdriver. There are two insertion slots on both the top and bottom of the GP unit.
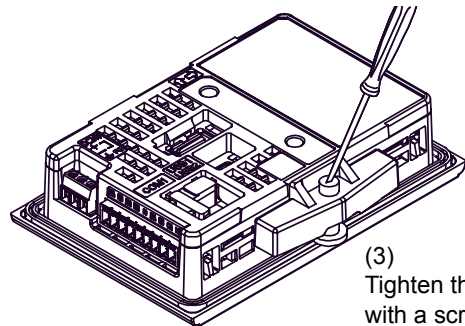
(3)
Tighten the screw with a screwdriver

Top

Insertion Slots

Bottom
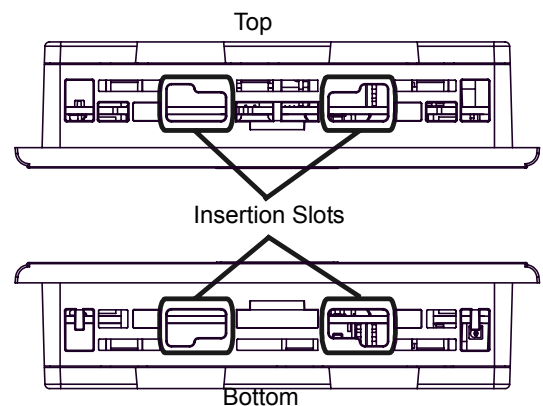
IMPORTANT   •   Tightening the screws with too much force can damage the GP unit's plastic case.

•   In order to guarantee water repelling effect the necessary torque is 0.52N•m.

4.2   Wiring Precautions

This section describes the procedures and precautions for wiring power cords.

4.2.1   Connecting the Power Cord

⚠ WARNING

🔴 To avoid an electric shock, prior to connecting the GP unit's power cord terminals to the power terminal block, confirm that the GP unit's power supply is completely turned OFF, via a breaker, or similar unit.

🔴 Supplying a power voltage other than that specified will damage the power source and the GP unit.

🔴 Since there is no power switch on the GP unit, be sure to attach a breaker-type switch to its power cord.
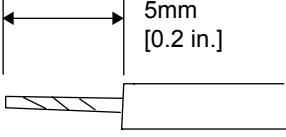
🔴 When the FG terminal is connected, be sure the wire is grounded.

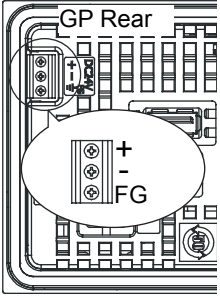| IMPORTANT	• When the FG terminal is connected, be sure the wire is grounded. Not grounding the GP unit will result in excess noise and vibration.
	• The SG and FG terminals are connected internally in the GP unit. When connecting the SG wire to another device, be sure that the design of the system/connection does not produce a shorting loop.

■Power Cord Specifications

Power Cord Diameter	Simple Wire: 0.75 to 1.5mm^2 Stranded Wire: 0.75 to 1mm^2 (18 - 16 AWG)
Conductor Type	Simple or Twisted Wire
Conductor Length	5mm [0.2 in.]

IMPORTANT
- Use copper conductors only.
- If the Conductor's end (individual) wires are not twisted correctly, the end wires may either short against each other, or against an electrode.

■Power Connector Specifications

GP Rear	+	24V
	-	0V
	FG	FG Grounding Terminal connected to the GP

NOTE
- The power supply connector is MKDS 1/3-3,81 (made by Phoenix Contact).

■Connecting the Power Cord

IMPORTANT
- To avoid an electric shock, prior to connecting the GP unit's power cord terminals to the power terminal block, confirm that the GP unit's power supply is completely turned OFF, via a breaker, or similar unit.
- The temperature rating of field installed Conductors:75°C only.

(1) Confirm that the GP unit's Power Cord is unplugged from the power supply.

(2) Use a flat-blade screwdriver (Size 0.4 x 2.5) to loosen the terminal screws.

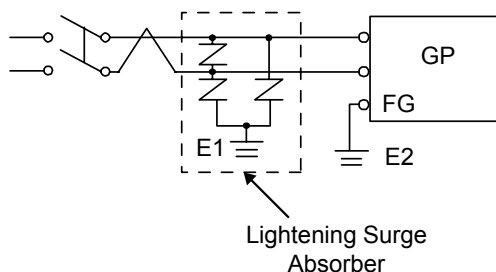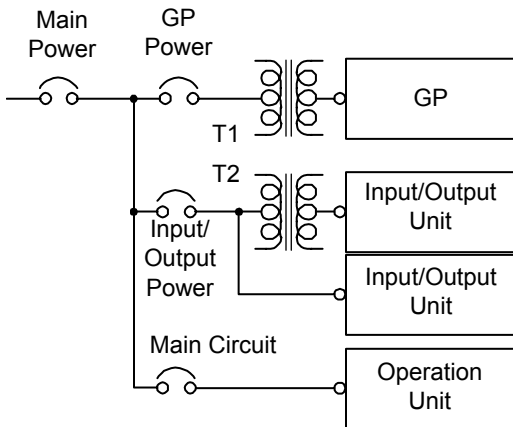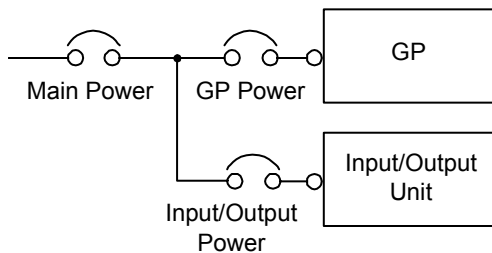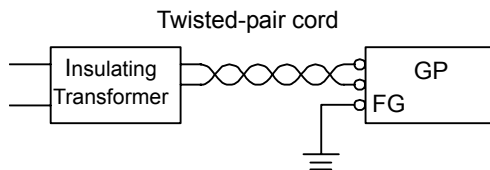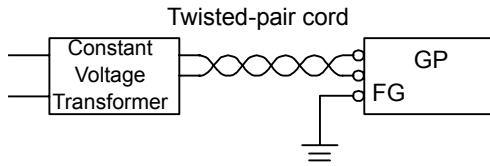(3) Strip the power cord, and attach it to the power connector.

(4) Use a flat-blade screwdriver to tighten the appropriate terminal screws on the terminal connector from step 3.

IMPORTANT

• Use a flat-blade screwdriver (Size 0.4 x 2.5) to tighten the terminal screws. The torque required to tighten these screws is 0.28N•m (2.5 [Lb•in]).

• The power connector cannot be removed because it is mounted to GP unit. Do not attempt to remove or tamper with the power connector. It may damage the power connector.

• Be sure to loosen the terminal screws before pulling out the power cord. The power connector may be damaged by pulling the power cord when attached to the power connector.

• Do not solder the cable connection. Doing so may damage the unit due to abnormal heat or cause a fire.

4.2.2   Connecting the Power Supply

This section describes the precautions for supplying a power voltage.

Twisted-pair cord

| Constant Voltage Transformer | GP FG |

Twisted-pair cord

| Insulating Transformer | GP FG |

| Main Power   GP Power | GP |
| Input/Output Power | Input/Output Unit |

Main Power   GP Power

T1

T2

Input/ Output Power

Main Circuit

| GP |
| Input/Output Unit |
| Input/Output Unit |
| Operation Unit |

| GP FG |
E1   E2

Lightening Surge Absorber

• If the supplied voltage exceeds the GP unit's range, connect a constant voltage transformer.

$\boxed{\text{SEE} \rightarrow}$ *Chapter 3 Specifications (page 3-1)*

• For between the line and ground, select a power supply that is low in noise. If there is an excess amount of noise, connect a insulating transformer.

IMPORTANT   • Use constant voltage and insulating transformers with capacities exceeding Power Consumption value.

• When supplying power to the GP unit, be sure to separate the input/output and power lines, as shown.

• To increase the noise resistance quality of the power cord, simply twist each power wire before attaching the Ring Terminal.

• The power supply cable must not be bundled or positioned close to main circuit lines (high voltage, high current), or input/output signal lines.

• Connect a lightening surge absorber, as shown in the diagram, to deal with power surges.

• To avoid excess noise, make the power cord as short as possible.

IMPORTANT   • Be sure to ground the surge absorber (E1) separately from the GP unit (E2).

• Select a surge absorber that has a maximum circuit voltage greater than that of the peak voltage of the power supply.
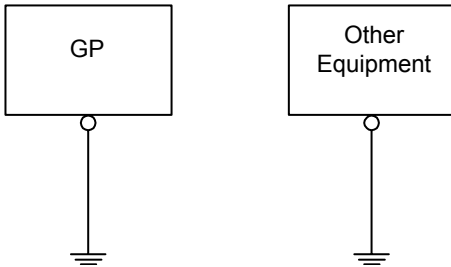
4.2.3   Grounding

This section describes the precautions for grounding the GP unit.
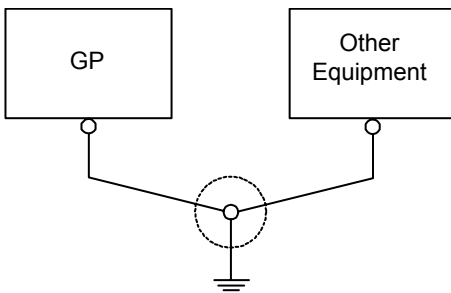
⚠ CAUTION

🛑 Do not use common grounding, since it can lead to an accident or machine breakdown.
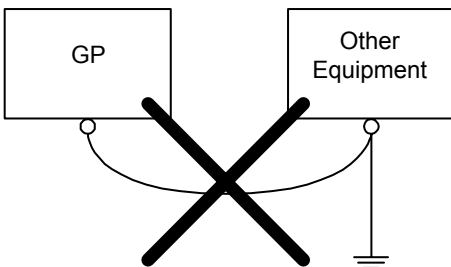
(a) Exclusive Grounding (BEST)

(b) Exclusive Grounding (OK)

(C) Common Grounding (Not OK)

• When supplying power to the GP unit, be sure to separate the input/output and power lines, as shown. [diagram (a)]

IMPORTANT	• Check that the grounding resistance is 100Ω or less.

   • Check that the grounding resistance is 100Ω or less.

   • FG and SG terminals are internally connected in the GP. When connecting an external device to the GP using the SG terminal, be sure to check that no short-circuit loop is created when you setup the system.

   • The grounding wire should have a cross sectional area greater than 2mm^2 Create the grounding point as close to the GP unit as possible, and make the wire as short, as possible. When using a long grounding wire, replace the thin wire with a thicker wire, and place it in a duct.

• If exclusive grounding is not possible, use a common grounding point. [diagram (b)] A D-type grounding or equivalent should be used for the grounding point.
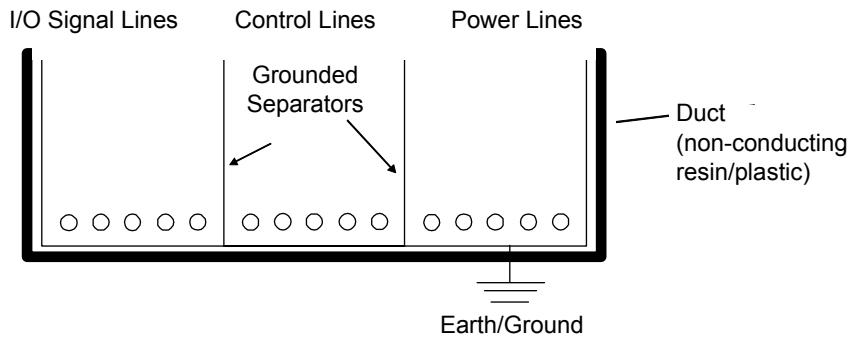
NOTE   • If the equipment does not function properly when grounded, disconnect the ground wire from the FG terminal.

4.2.4   Wiring Precautions

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

Duct for I/O Signal   Duct for Control   Duct for Power
      Lines   Lines   Lines
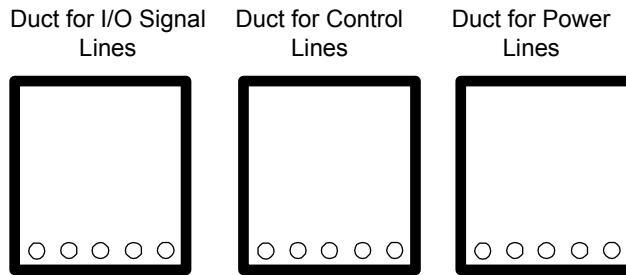
If different wires must be placed in the same duct, separate them with an earthed/grounded divider.

I/O Signal Lines   Control Lines   Power Lines

Grounded
Separators

Duct
(non-conducting
resin/plastic)

Earth/Ground

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

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

4.3 USB Cable Clamp Attachment/Removal

This clamp is used to prevent the USB cable connected to the USB Interface of the GP unit from being unplugged due to vibration or other causes.
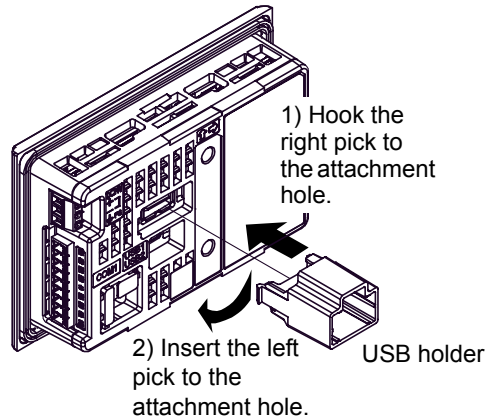
4.3.1 USB (Type A) Interface

■Attachment

(1) Before starting the procedure, lift down the tab of the USB Holder and remove the USB Cover.
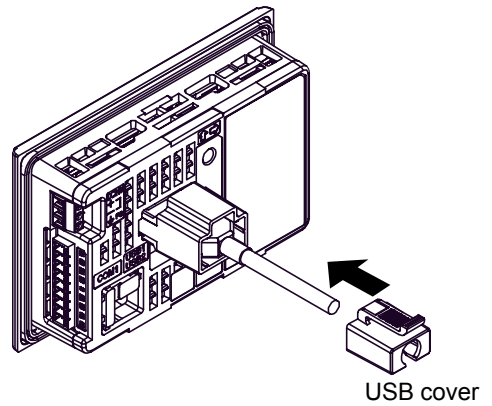

1) Lift down the tab.

Tabs

2) Remove the USB Cover.
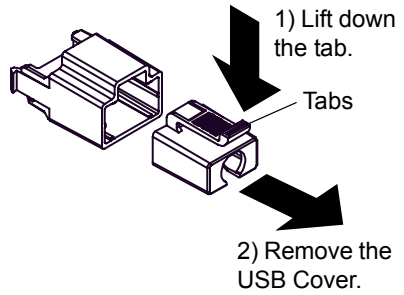
(2) Attach the USB Holder to the USB (Type A) Interface part of the main unit. Hook the right pick of the USB holder to the attachment hole of the main unit and then insert the left pick as shown to fix the USB holder.

1) Hook the right pick to the attachment hole.

2) Insert the left pick to the attachment hole.

USB holder

(3) Insert the USB cable into the USB (Type A) Interface.
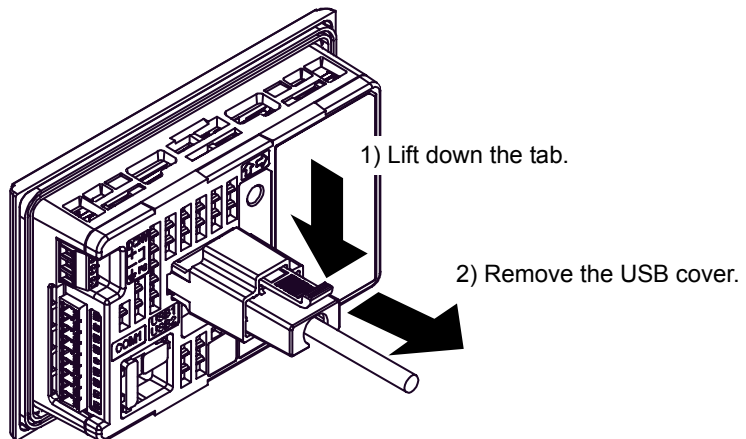

USB (Type A) cable
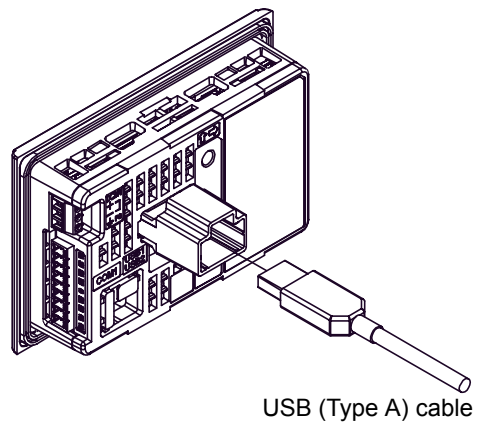
(4) Attach the USB cover to fix the USB cable. Insert
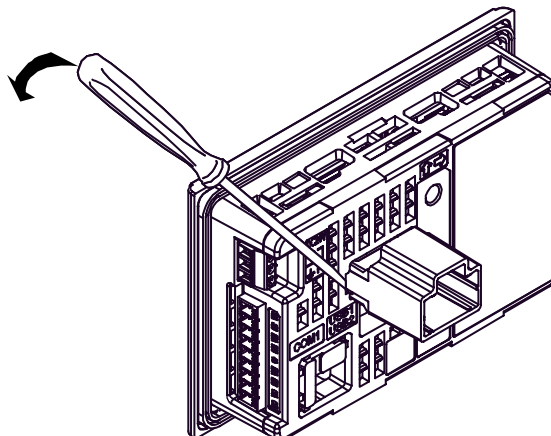
the USB cover into the tab of the USB Holder.

USB cover

■Removal

(1) Lift down the tab of the USB Holder and then remove the USB cover and the USB cable as shown.
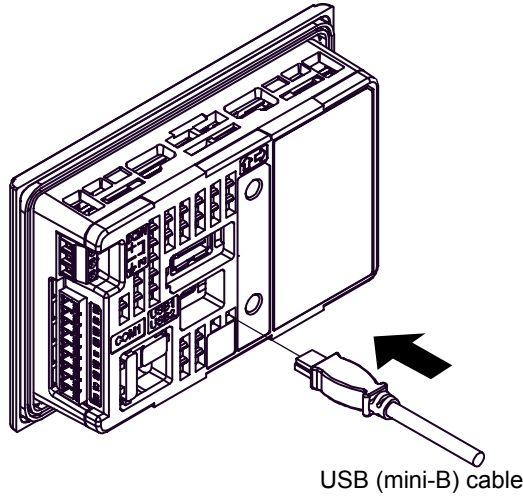
1) Lift down the tab.

2) Remove the USB cover.

(2) Insert a flathead screwdriver in the hole of the USB holder, as shown, and push the USB connector out

of the USB holder by lifting the tip of the flathead screwdriver.

4.3.2   USB (mini-B) Interface

■Attachment

(1)   Insert the USB cable into the USB (mini-B) interface.

USB (mini-B) cable
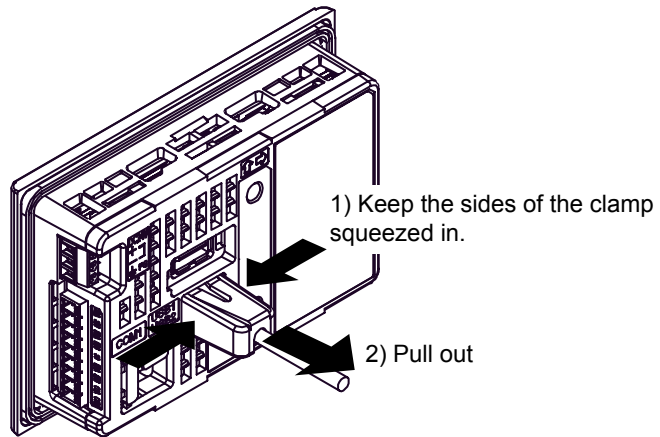
(2)   Hold the clamp so that the USB cable can go through it. Squeeze the locking tabs on the clamp as you insert it into the mounting hole.

2) Insert into the mounting hole.

1) Squeeze the locking tabs on the USB clamp
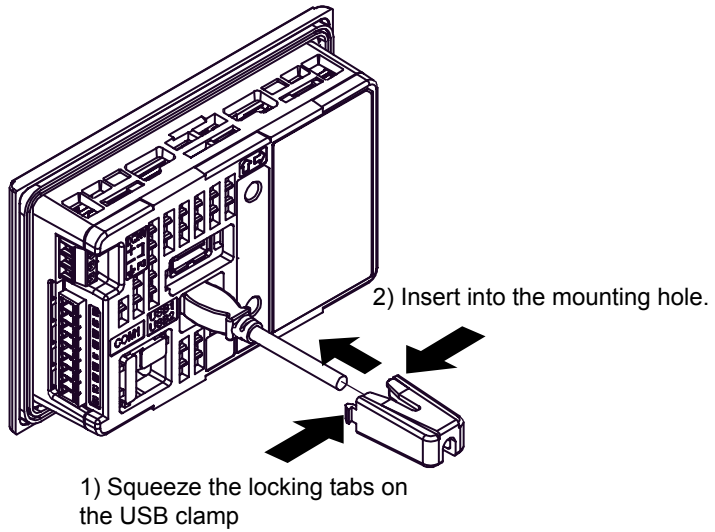
■Removal

   (1)   The clamp can be removed by squeezing the sides of the clamp and pulling, as shown in the Figure.

1) Keep the sides of the clamp squeezed in.

2) Pull out

5 | Maintenance

1. Cleaning the Display
2. Periodic Check Points
3. Replacing the Installation Gasket
4. Replacing the Backlight

This chapter explains cautions and inspection criteria that will ensure trouble-free use of the GP.

5.1 Cleaning the Display

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

IMPORTANT
- 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.

5.2 Periodic Check Points

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

■GP Operation Environment

☐ Is the operating temperature within the allowable range (0ºC to 50ºC)?

☐ Is the operating humidity within the specified range (10%RH to 90%RH, dry bulb temperature of 39ºC or less)?

☐ Is the operating atmosphere free of corrosive gasses?

When using the GP unit inside a panel, the ambient environment refers to the interior of the panel.

■Electrical Specifications

☐ Is the input voltage appropriate?

DC19.2 to 28.8V

■Related Items

☐ Are all power cords and cables connected properly? Have any become loose?

☐ Are all installation fasteners holding the unit securely?

☐ Are there many scratches or traces of dirt on the installation gasket?

5.3 Replacing the Installation Gasket

The installation gasket provides protection against dust and moisture.

IMPORTANT
- 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 to be equivalent to IP65f / NEMA #250 TYPE4X/13. Be sure to change the gasket at least once a year, or when scratches or dirt become visible.
- The GP unit installation gasket's model number is "ZC9WG31."

■Installation Gasket Attachment Procedure

(1) Place the GP on a flat, level surface facing the display face downwards.

(2) Remove the gasket from the GP.

(3) Attach the new gasket to the GP. Be sure to insert the gasket into the GP's groove so that the gasket's groove sides are vertical.
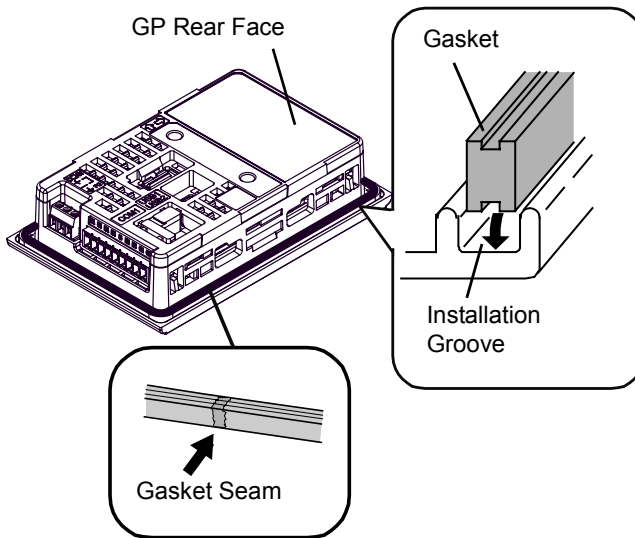
(4) Check that the gasket is attached correctly to the GP.

IMPORTANT
- The gasket must be inserted correctly into the groove for the GP's moisture resistance.
- Since the gasket is flexible but not elastic, be careful not to stretch it unnecessarily, as doing so could tear the gasket.
- Be sure the gasket's seam is not inserted into any of the unit's corners, only in the straight sections of the groove. Inserting it into a corner may lead to its eventually tearing.
- To ensure stable resistance against dust and moisture, insert the gasket so that the seam is at the bottom of the GP unit.
- The upper surface of the gasket should protrude approximately 2.0 mm out from the groove. Be sure to check that the gasket is correctly inserted before installing the GP into a panel.

2.0mm
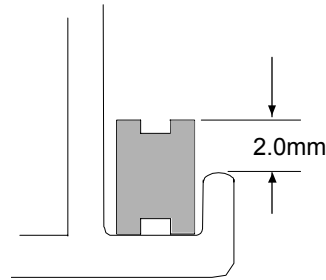
5.4   Replacing the Backlight

IMPORTANT   •   The backlight of the GP-4100 Series cannot be replaced by the user. When the backlight needs to be replaced, please contact your local GP distributor.