Pro-face
for the best interface

GP-4201TM/4301TM

Hardware Manual

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Pro-face nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Pro-face software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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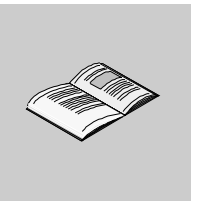
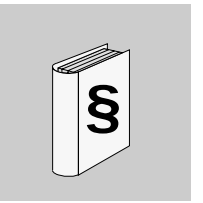


Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

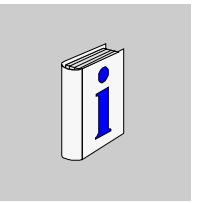
NOTICE is used address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Pro-face for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved.

About the Book



At a Glance

Thank you for purchasing Pro-face's GP-4201TM/4301TM (Hereafter referred to as the "GP unit").

Document Scope

This manual describes how to use the GP unit.

Validity Note

This documentation is valid for the GP unit when used with GP-Pro EX version 2.71 or later.

The technical characteristics of the device(s) described in this manual appear online. To access this information online, please go to our site http://www.proface.com/otasuke/

The characteristics presented in this manual should be constantly improved for clarity and accuracy. In the event that you see a difference between the manual in your PC and online information, use the online information as your reference.

Product Related Information

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program, install, alter, and apply this product.

Follow all local and national safety codes and standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Related Documents

Title of Documentation
GP-Pro EX Reference Manual
GP-Pro EX Device/PLC Connection Manual
GP-Pro EX Maintenance/Troubleshooting

You can download these technical publications and other technical information from our website "Otasuke Pro!" at http://www.pro-face.com/otasuke/.

Model Name Indication

Model name

PFXGM4 * ** T A D

A B C D E

A	2	GP-4200 series (3.5-inch): QVGA (320 x 240 dots)
	3	GP-4300 series (5.7-inch): QVGA (320 x 240 dots)
B	01	RS-232C/RS-422/RS-485
C	T	TFT color LCD
D	A	Analog Touch Panel
E	D	DC type power supply is used.

GP-4201TM/4301TM Model Names

Series		Names	Models
GP4000 Series	GP-4200 Series	GP-4201TM	PFXGM4201TAD
	GP-4300 Series	GP-4301TM	PFXGM4301TAD

Global Code

A global code is assigned to every Pro-face product as a universal model number.

For more information on product models and their matching global codes, please refer to the following URL.

http://www.pro-face.com/product/globalcode.html

General Overview

1

Overview

This chapter describes the GP unit's General Overview.

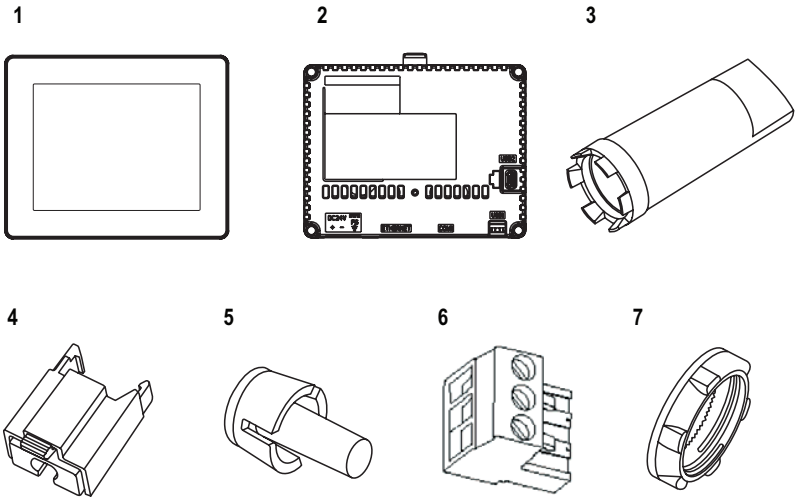
What's in this Chapter?

This chapter contains the following topics:

Package Contents

Package Contents

Verify all items listed here are present in your package:



1 Display Module (1)
2 Rear Module (1)
3 Socket Wrench (1)
4 USB Clamp Type A (1Port) (1)
5 Anti-rotation Tee (1)
6 DC Power Supply Connector (1)
7 Display Installation Nut (Attached to the Display Module) (1)
8 GP-4201TM/4301TM Installation Guide (1)
9 Warning/Caution Information (1)

Critical systems, Detected Alarms and Handling Requirements

Critical detected alarm indicators and system functions require independent and redundant protection hardware and/or mechanical interlocks.

If the unit for any reason becomes inoperative (for example, an inoperative backlight) it may be difficult or impossible to identify a function. Functions that may present a hazard if not immediately executed, such as emergency stop, must be provided independently of the unit. The design of the control system must take into account an inoperative unit (backlight) and that the operator is unable to control the machine or respond to detected errors using the unit.

When the power is cycled, wait at least 10 seconds before restoring the power to the GP Unit. Switching the power OFF and ON quickly can damage the unit.

⚠ WARNING

LOSS OF CONTROL

- Consider the potential failure modes of control paths in the machine control system design, such as:
  - The possibility of backlight failure,
  - Unanticipated link transmission delays or failures,
  - The operator being unable to control the machine,
  - The operator making errors in the control of the machine.
- Provide a means to achieve a safe state during and after a path failure for critical control functions such as emergency stop and overtravel stop.
- Provide separate or redundant control paths for critical control functions.
- Test individually and thorougly each implementation of the GP unit for correct operation before service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Do not use the unit as the only means of control for critical system functions such as motor start/stop or power control.
- Do not use the unit as the only notification device for critical alarms, such as device overheating or overcurrent.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Handling the LCD Panel

The following characteristics are specific to the LCD unit and are considered normal behavior:

- LCD screen may show unevenness in the brightness of certain images or may appear different when seen from outside the specified viewing angle. Extended shadows, or cross-talk, may also appear on the sides of screen images.
- LCD screen pixels may contain black and white colored spots and color display may seem to have changed over time.
- When the same image is displayed on the screen for a long period, an after-image may appear when the image is changed.

  NOTE: Do not display the same image for a long time, change the screen image periodically.

⚠ CAUTION

SERIOUS EYE AND SKIN INJURY

The liquid present in the LCD panel contains an irritant:

- Avoid direct skin contact with the liquid.
- Wear gloves when you handle a broken or leaking unit.
- Do not use sharp objects or tools in the vicinity of the LCD touch panel.
- Handle the LCD panel carefully to prevent puncture, bursting, or cracking of the panel material.

If the panel is damaged and any liquid comes in contact with your skin, immediately rinse the area with running water for at least 15 min.

If the liquid gets in your eyes, immediately rinse your eyes with running water for at least 15 minutes and consult a doctor.

Failure to follow these instructions can result in injury or equipment damage.

Using Touch Panel Correctly

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Operate the GP unit touch panel with only one finger.
- Do not activate two or more points of the touch panel simultaneously.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

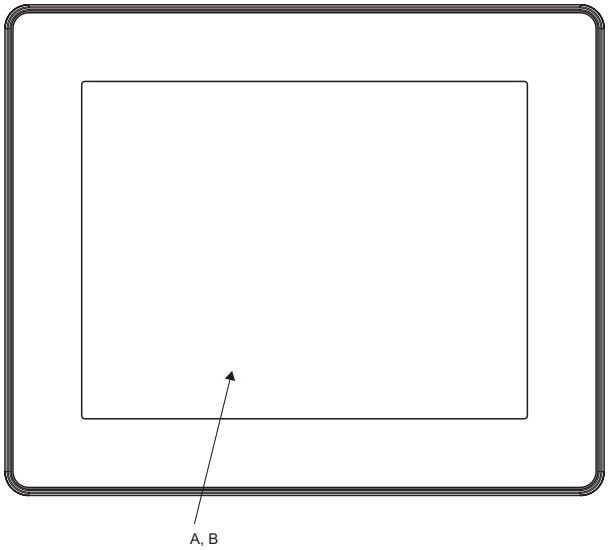
Use only one finger to select an object on the touch panel.

If the touch panel receives pressure at two or more points at the same time, an unintended object could be selected.

Parts Identification and Functions

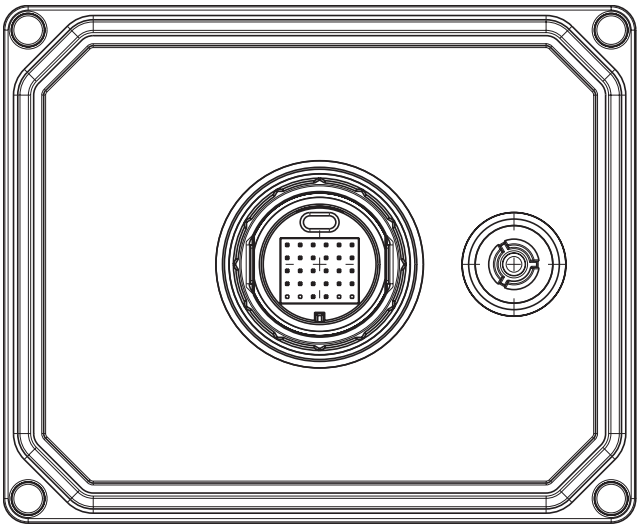
Display Module

Front:



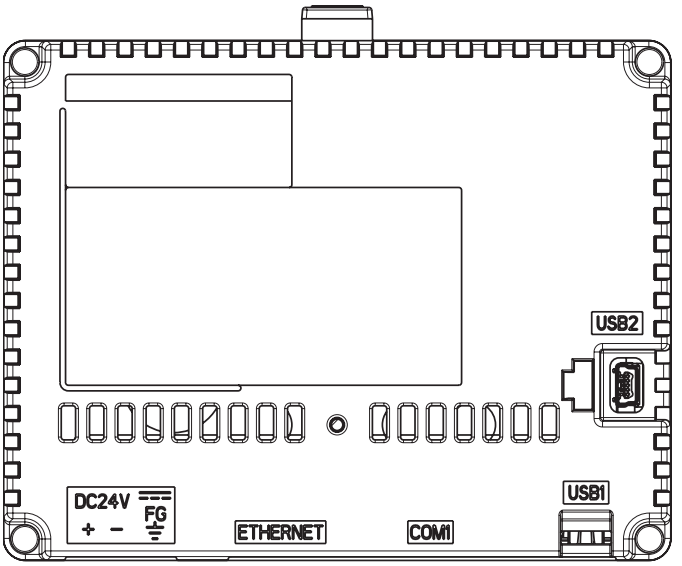
A Display: displays user created screens and remote equipment variables.
B Touch panel: performs screen change operations and sends data to the host (PLC).

Rear:

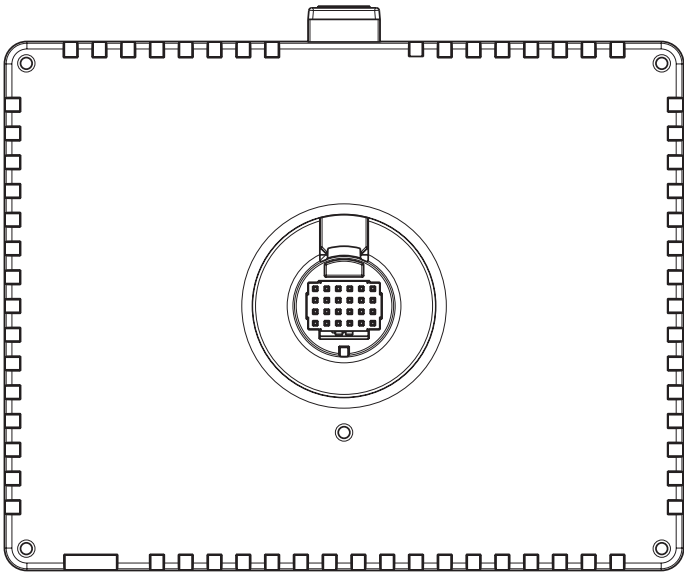


Rear Module

Front:

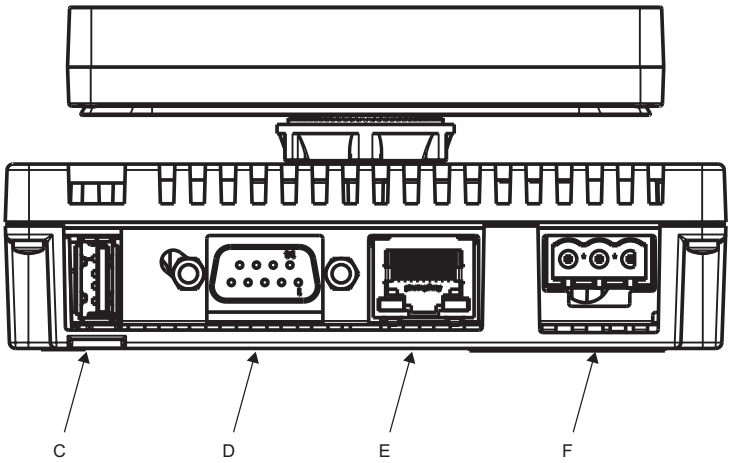


Rear:



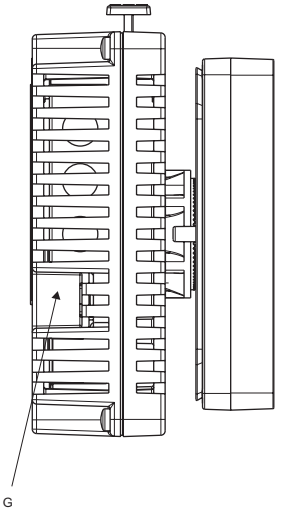
Connectors:

Bottom:



C USB (Type A) interface connector: connects the memory stick to the unit.
D Serial I/F (host I/F): connects a RS232C/RS422/RS485 cable (from the host/PLC) to the GP unit. D-Sub 9-pin plug type connector.
E Ethernet Interface (LAN): connects an Ethernet cable (from the host/PLC) to the unit.
F DC Power Supply Connector: connects the power input and ground wires to the unit.

Side:



G USB (mini-B) interface connector: connects the data transfer PC cable to the unit.

Certifications and Standards

Introduction

Pro-face submitted this product for independent testing and qualification by third-party listing agencies. These agencies have certified this product as meeting the following standards.

Agency Certifications for GP Unit

GP unit is certified by the Underwriters Laboratory according to:

- UL 508 and CSA C22.2 n°142 for Industrial Control Equipment
- UL1604, ANSI/ISA 12.12.01 and CSA C22.2 n°213 for Electrical Equipment for Use in Class I, Division 2 Groups A, B, C and D Hazardous (classified) Locations

Hazardous Substances

GP unit is designed for compliance with:

- WEEE, Directive 2002/96/EC
- RoHS, Directive 2002/95/EC
- RoHS China, Standard SJ/T 11363-2006

UL Conditions of Acceptability and Handling Cautions for GP Unit

The GP unit is suitable for use in hazardous locations in accordance with Class 1, Division 2 Groups A, B, C and D standards. All relevant local, state, and regional codes must be followed.

CE Markings

This product conforms to the necessary requirements of the following Directives for applying the CE label:

- 2006/95/EC Low Voltage Directive
- 2004/108/EC EMC Directive

This conformity is based on compliance with IEC61131-2.

⚠ WARNING

RISK OF EXPLOSION IN HAZARDOUS LOCATIONS

- Verify that the power, input and output (I/O) wiring are in accordance with Class I, Division 2 wiring methods.
- Do not substitute components that may impair compliance to Class I, Division 2.
- Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- Securely lock externally connected units and each interface before turning on the power supply.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Interfaces are: Serial, Ethernet, and USB I/F.

⚠ WARNING

RISK OF EXPLOSION IN HAZARDOUS LOCATIONS

- Do not disconnect while circuit is live.
- Potential electrostatic charging hazard: wipe the front panel of the terminal with a damp cloth before turning ON.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

KC Markings

사용자안내문

기 종 별	사 용 자 안 내 문
A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Device Connectivity

2

Introduction

This chapter presents the equipment connectable to GP unit.

What's in this Chapter?

This chapter contains the following topics:

System Design

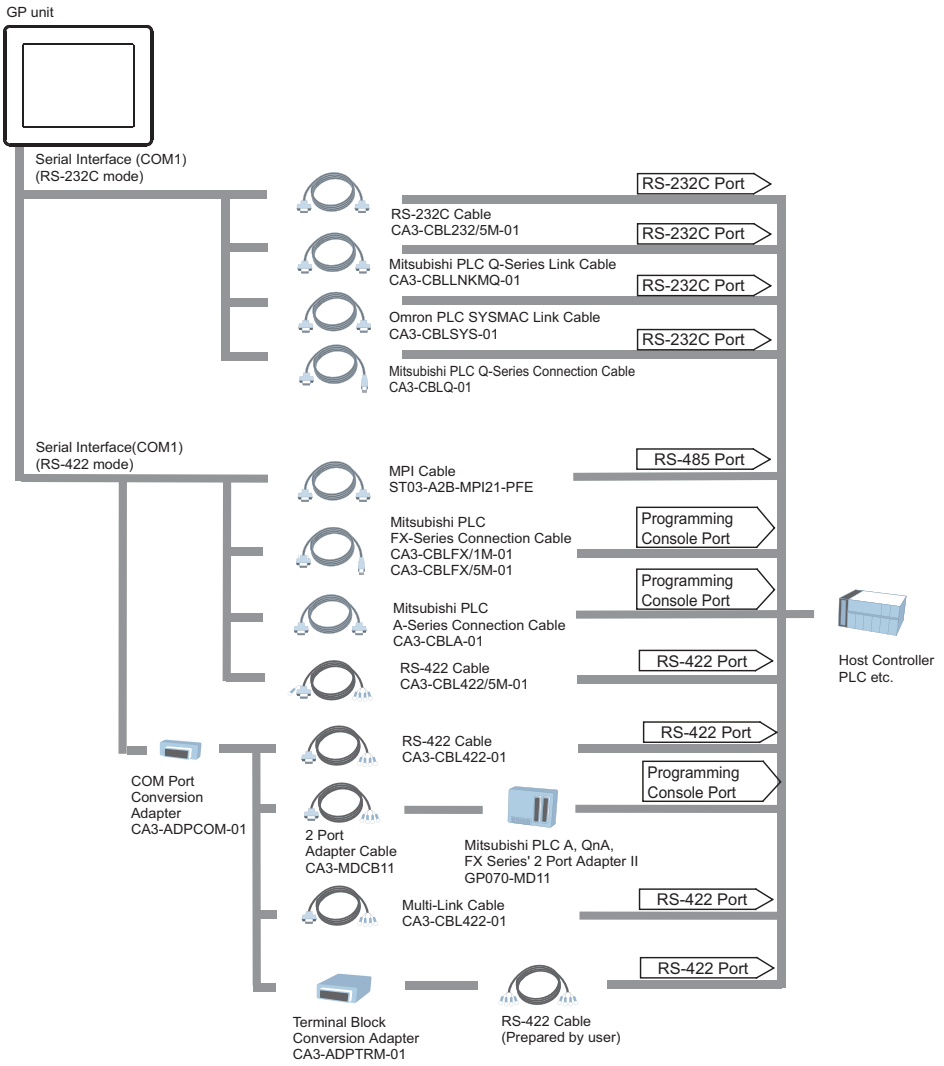
Introduction

The following diagrams represent equipment that can be connected to the unit.

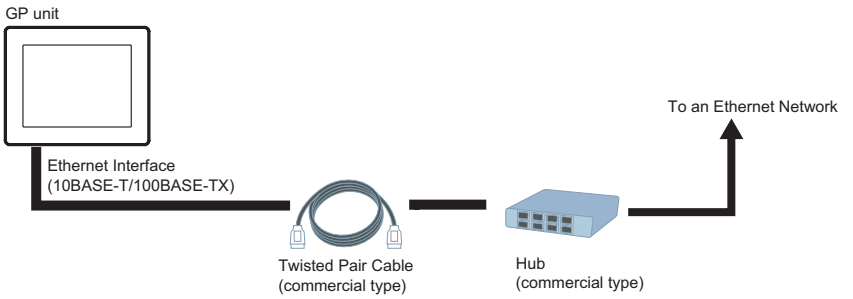
RUN Mode Peripherals - Serial Communication

NOTE:

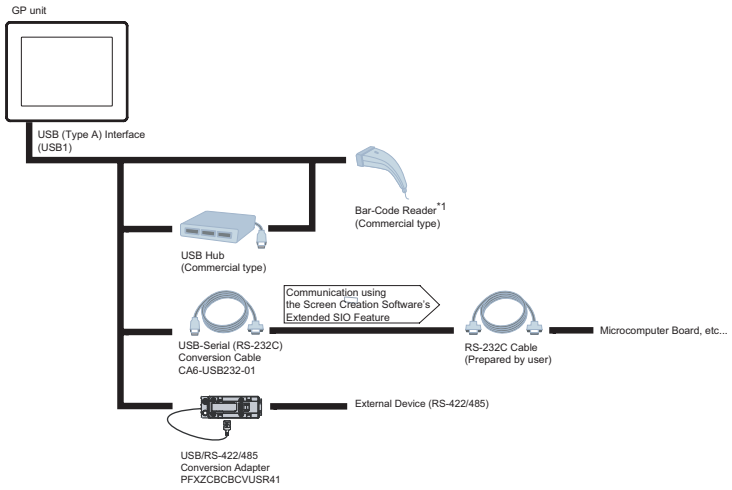
For instructions on how to connect to other devices, always refer to the “GP-Pro EX Device/PLC Connection Manual”.



RUN Mode Peripherals - Ethernet Communication



RUN Mode Peripherals - USB Interface



*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.

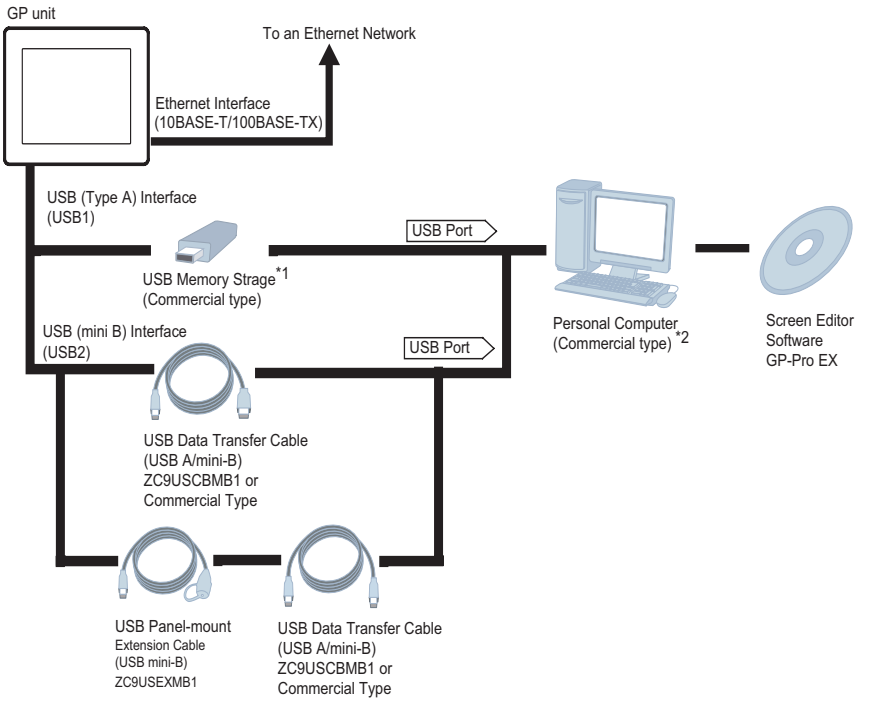
⚠ CAUTION

GP UNIT RESET

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

Failure to follow these instructions can result in GP unit Reset.

Edit Mode Peripherals



*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.
Refer to GP-Pro EX Reference Manual.

Accessories

Serial Interface Item

Product Name	Model No.	Description
RS-232C Cable (5m)	CA3-CBL232/5M-01	Connects a host controller to the GP unit. (RS-232C)
RS-422 Cable (5m)	CA3-CBL422/5M-01	Connects a host controller to the GP unit. (RS-422 / Socket Type)
Mitsubishi PLC Q-Series Link Cable (5m)	CA3-CBLLNKMQ-01	Connects Mitsubishi PLC Q-Series (or other host controller) to the GP unit. (RS-232C)
Omron PLC SYSMAC Link Cable (5m)	CA3-CBLSYS-01	Connects Omron PLC SYSMAC Series unit (or other host controller) to the GP unit. (RS-232C)
Mitsubishi PLC A-Series Connection Cable (5m)	CA3-CBLA-01	Connects Mitsubishi PLC A, QnA Series programming console I/F to GP unit. (Simultaneous use of programming console is not possible.)
Mitsubishi PLC Q-Series Connection Cable (5m)	CA3-CBLQ-01	Connects Mitsubishi PLC Q-Series programming console I/F to GP unit. (Simultaneous use of programming console is not possible.)
Mitsubishi PLC FX-Series Connection Cable	CA3-CBLFX/1M-01 (1m) CA3-CBLFX/5M-01 (5m)	Connects Mitsubishi PLC FX-Series programming console I/F and GP unit. (Simultaneous use of programming console is not possible.)
RS-422 Cable (5m)	CA3-CBL422-01	Connects a host controller to the GP unit. (RS-422 / Plug Type)
2 Port Adapter Cable (5m)	CA3-MDCB11	Connects Mitsubishi PLC to the GP unit using 2 port adapter II (RS-422).
Mitsubishi PLC A, QnA, FX Series 2 Port Adapter II	GP070-MD11	Allows simultaneous use of an GP unit Series unit and a Mitsubishi PLC A, QnA, FX Series peripheral device.
Terminal Block Conversion Adapter	CA3-ADPTRM-01	Connects output from a serial interface with an RS-422 terminal block.
COM Port Conversion Adapter	CA3-ADPCOM-01	Connects optional RS-422 communication items to GP unit's COM1 port.
Multi-Link Cable	CA3-CBLMLT-01 (5m)	Connects a host controller to the GP for multi-link (n:1) communication.
9-pin-to-25-pin RS-232C Conversion Cable	CA3-CBLCBT232-01 (0.2m)	Connects a standard RS-232C cable (GP Connector,D-Sub 25-pin) to the GP.
9-pin-to-25-pin RS-422 Conversion Cable	CA3-CBLCBT422-01 (0.2m)	Connects a standard RS-422 cable (GP Connector,D-Sub 25-pin) to the GP.
MPI Cable (3.5m)	ST03-A2B-MPI21-PFE	Connects a host controller to the GP unit for MPI communication.

USB Interface Item

Product Name	Model No.	Description
USB Front Cable (1m)	CA5-USBEXT-01	Extension cable attaching USB interface to front panel.
USB-Serial (RS-232C) Conversion Cable (0.5m)	CA6-USB232-01	Cable for converting a GP unit's USB interface into a serial interface (RS-232C). Can be used to transfer project data created with the Screen Editor&Logic Program Software via a serial interface.*1
USB Transfer Cable (USB Type A/mini-B) (1.8 m)	ZC9USCBMB1	Cable for transferring screen data from a PC (USB Type A) to the GP unit (USB mini-B).
USB Panel-mount Extension Cable (USB mini-B) (1 m)	ZC9USEXMB1	Extension cable attaching to the USB (mini-B) interface on the front side of the operation panel.

*1 Requires an RS-232C cable (prepared by user) for connection. For details regarding system design, refer to "RUN Mode Peripherals - USB Interface" (page 22).

Option Items

Product Name	Model No.	Corresponding GP unit	Description
Screen Protection Sheet	CA6-DFS4-01	GP-4201TM	Disposable, dirt-resistant sheet for the GP unit's screen. (5 sheets/set) (Hard type)
	PFXZCBDS61	GP-4301TM	

Maintenance Items

Product Name	Model No.	Description
Display Installation Nut	PFXZGMNT1	Nut to install the display module (10 pcs/set)
Socket Wrench	PFXZGMSW1	Socket wrench to tighten and loosen the display installation nut
Accessories Kit	PFXZGMAK1	Anti-rotation Tee, USB cable clamp to prevent disconnection (Type A, Mini-B, for 1 port), 2mm-hight spacer to adjust installation panel thickness (1pcs/each)
DC Power Supply Connector	PFXZGMCNDC1	Connector to connect DC power supply cables (5 pcs/set)

Specifications

3

Overview

This chapter presents the GP unit specifications.

What's in this Chapter?

This chapter contains the following sections:

3.1 General Specifications

General Specification

Electrical Specifications

	Rated Input Voltage	Input Voltage Limits	Voltage Drop	Power Consumption	In-Rush Current	Voltage Endurance	Insulation Resistance
GP-4201TM	24 Vdc	20.4...28.8 Vdc	10 ms or less	6.5 W or less	30 A or less	1,000 Vac 20 mA for 1 min (between charging and FG terminals)	500 Vdc, 10 MΩ or more (between charging and FG terminals)
GP-4301TM	24 Vdc	20.4...28.8 Vdc	7 ms or less	6.8 W or less	30 A or less	1,000 Vac 20 mA for 1 min (between charging and FG terminals)	500 Vdc, 10 MΩ or more (between charging and FG terminals)

Environmental Specifications

		GP-4201TM	GP-4301TM
Physical Environment	Surrounding Air Temperature	0...50 °C (32...122 °F)	0...50 °C (32...122 °F)
	Storage Temperature	-20...60 °C (-4...140 °F)	-20...60 °C (-4...140 °F)
	Surrounding Air and Strage Humidity	85 % RH (Wet bulb temperature: 39 °C (102.2 °F) or less - no condensation.)	85 % RH (Wet bulb temperature: 39 °C (102.2 °F) or less - no condensation.)
	Dust	0.1 mg/m^3 (10^{-7} oz/ft^3) or less (non-conductive levels)	0.1 mg/m^3 (10^{-7} oz/ft^3) or less (non-conductive levels)
	Pollution Degree	For use in Pollution Degree 2 environment	For use in Pollution Degree 2 environment
	Corrosive Gases	Free of corrosive gases	Free of corrosive gases
	Atmospheric Pressure (Operating Altitude)	800...1,114 hPa (2,000 m (6,561 ft) or lower)	800...1,114 hPa (2,000 m (6,561 ft) or lower)
Mechanical Environment	Vibration Resistance	EN61131-2 compliant 5...9 Hz Single amplitude: 3.5 mm (0.14 in.)	EN61131-2 compliant 5...9 Hz Single amplitude: 3.5 mm (0.14 in.)
Electrical Environment	Noise Immunity	Noise voltage: 1,000 Vp-p Pulse width: 1 µs Rise time: 1 ns	Noise voltage: 1,000 Vp-p Pulse width: 1 µs Rising time: 1 ns
	Electrostatic Discharge Immunity	6 kV direct contact 8 kV air contact	6 kV direct contact 8 kV air contact

Structural Specifications

	GP-4201TM	GP-4301TM
Structure	NEMA#250 TYPE 4X (indoor, installed in an enclosure) Front panel: IP 65f (IEC60529) Rear panel : IP 20 (IEC 60529)	NEMA#250 TYPE 4X (indoor, installed in an enclosure) Front panel: IP 65f (IEC60529) Rear panel : IP 20 (IEC 60529)
Cooling Method	Natural air circulation	Natural air circulation
Weight	0.36 kg (0.79 lb.) or less (main unit only)	0.62 kg (1.36 lb.) or less (main unit only)
Grounding	Functional grounding:Grounding resistance of 100Ω, 2 mm^2 (AWG 14) orthicker wire, or your country's applicable standard.	

3.2 Functional Specifications

Overview

This section presents the unities functional specifications of the display, memory and interfaces.

What's in this Section?

This section contains the following topics:

Display

Display Specifications

		GP-4201TM	GP-4301TM
Display Type		TFT Color LCD	TFT Color LCD
Resolution		320 x 240 pixels (QVGA)	320 x 240 pixels (QVGA)
Effective Display Area		W70.56 x H52.92 mm (W2.78 x H2.08 in.)	W115.2 x H86.4 mm (W4.53 x H3.40 in.)
Display Colors		65,536 colors	65,536 colors
Backlight		White LED (User nonreplaceable parts.)	White LED (User nonreplaceable parts.)
Backlight Service Life		50,000 hrs. or more (continuous operation at 25°C (77°F) before backlight brightness decreases to 50%)	50,000 hrs. or more (continuous operation at 25°C (77°F) before backlight brightness decreases to 50%)
Brightness Control		16 Levels (Adjusted with the touch panel or the software)	16 Levels (Adjusted with the touch panel or the software)
Language Fonts		Japanese: 6,962 (JIS Standards 1 & 2) (including 607 non-kanji characters) ANK: 158 (Korean, Traditional Chinese and Simplified Chinese fonts are downloadable.	Japanese: 6,962 (JIS Standards 1 & 2) (including 607 non-kanji characters) ANK: 158 (Korean, Traditional Chinese and Simplified Chinese fonts are downloadable.
Character Sizes (2)		Standard font: 8 x 8, 8 x 16, 16 x 16 and 32 x 32 pixel fonts Stroke font: 6...127 pixel fonts Image font: 8...72 pixel fonts	Standard font: 8 x 8, 8 x 16, 16 x 16 and 32 x 32 pixel fonts Stroke font: 6...127 pixel fonts Image font: 8...72 pixel fonts
Font Sizes		Standard font: Width can be expanded up to 8 times. Height can be expanded up to 8 times.	Standard font: Width can be expanded up to 8 times. Height can be expanded up to 8times.
Text	8 x 8 pixels	40 characters x 30 rows	40 characters x 30 rows
	8 x 16 pixels	40 characters x 15 rows	40 character x 15 rows
	16 x 16 pixels	20 characters x 15 rows	20 character x 15 rows
	32 x 32 pixels	10 characters x 7 rows	10 character x 7 rows

Memory, Clock, and Touch Panel

Memory

Application Memory*1	FLASH EPROM 8 MB
Logic Program Area	None
Font Area	None
Data Backup	FLASH EPROM 128 KB*2
Variable Area	None

*1. Capacity available for user application.

*2. Stores the Alarm History Data, Recipe Data, and Brightness/Contrast Control Settings.

Clock

Uses the clock of an external device.

Set up the “Clock Updates” feature with the Editor software. Please refer to the GP-Pro EX Reference Manual “Common” - “Clock Update Settings” for details.

Touch Panel

Touch Panel Type	Resistive Film (analog)
Touch Panel Service Life	1 million times or more

3.3 Interface Specifications

Overview

This section presents the interface specifications of the GP unit.

What's in this Section?

This section contains the following topics:

Interface Specifications

Serial Interface COM1

Asynchronous Transmission	RS232C / RS422 / RS485
Data Length	7 or 8 bits
Stop Bit	1 or 2 bits
Parity	None, odd or even
Data Transmission Speed	2,400...115.200 kbps, 187,500 bps
Connector	D-Sub 9 pin (plug)

USB Interface

	Connector	**Power Supply Voltage**	**Maximum Current Supplied**	**Maximum Transmission Distance**
USB (Type A) Interface	USB2.0 (Type A) x 1	5Vdc ±5%	200mA	3 m (9.84 ft)
USB (mini-B) Interface	USB2.0 (mini-B) x 1	-	-	5 m (16.40 ft)

Ethernet Interface

Ethernet (LAN)	IEEE802.3i/ IEEE802.3u, 10BASE-T/100BASE-TX
Connector	Modular jack (RJ-45) x 1

NOTE: Ethernet networks must be installed by a trained and qualified person.

When connecting the external device directly to the GP unit with an Ethernet cable, depending on the external device, communication may not be possible.
Please connect over a network hub.

The following table describes the LED colors and status:

LED		**Contents**
Green	lit	Data transmission is available.
	blinking	Data transmission is occurring.

Specifications of Serial Interface COM1

Introduction

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

⚠ DANGER

ELECTRIC SHOCK

The serial port is not isolated. The SG (signal ground) and the FG (frame ground) terminals are connected inside the unit. When using the SG terminal to connect an external device to the unit:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #5 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect the #5 SG terminal to a known reliable ground connection to reduce the risk of damaging the RS232C/RS422/RS485 circuit.

Failure to follow these instructions will result in death or serious injury.

Serial Interface COM1

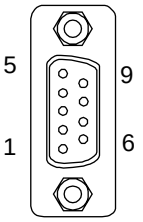
⚠ CAUTION

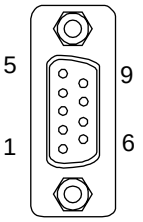
LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
- Securely attach communication cables to the panel or cabinet.

Failure to follow these instructions can result in injury or equipment damage.

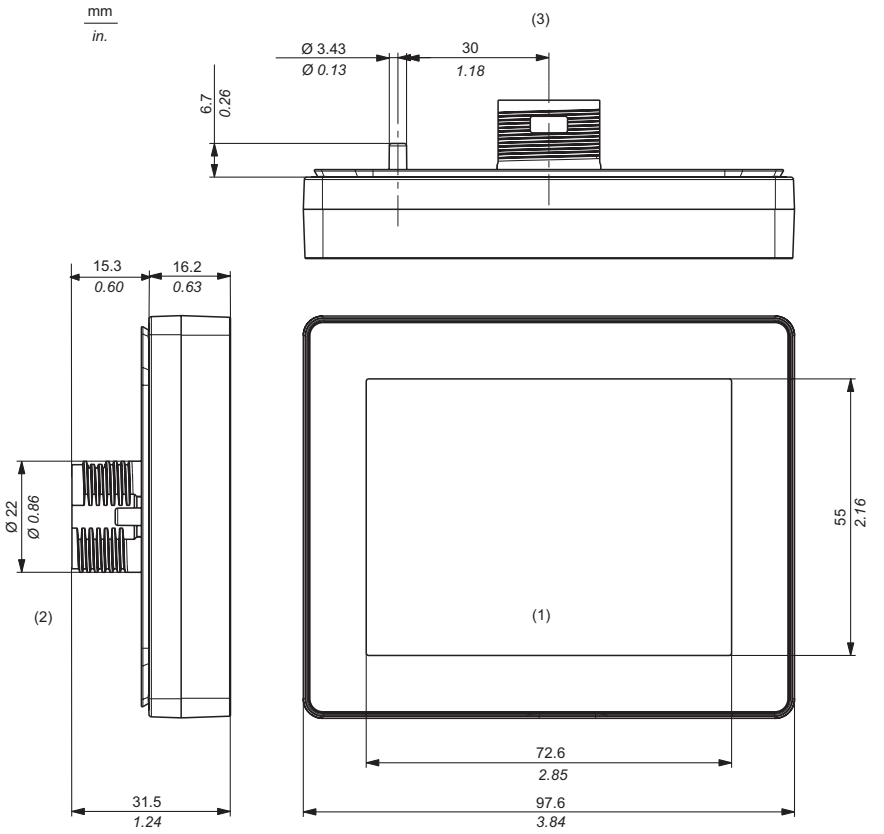
GP-4201TM/4301TM: D-Sub 9 pin plug connector via an RS-232C/RS-422/RS-485 cable.
Interfit bracket is #4-40 (UNC).

Pin Arrangement	Pin No.	RS-232C		
		Signal Name	Direction	Meaning
 (GP unit side)	1	CD	Input	Carrier Detect
	2	RD(RXD)	Input	Receive Data
	3	SD(TXD)	Output	Send Data
	4	ER(DTR)	Output	Data Terminal Ready
	5	SG	-	Signal Ground
	6	DR(DSR)	Input	Data Set Ready
	7	RS(RTS)	Output	Request to Send
	8	CS(CTS)	Input	Send Possible
	9	CI(RI)	Input	Called status display
	Shell	FG	-	Frame Ground (Common with SG)

Pin Arrangement	Pin No.	RS-422/RS-485		
		Signal Name	Direction	Meaning
 (GP unit side)	1	RDA	Input	Receive Data A(+)
	2	RDB	Input	Receive Data B(-)
	3	SDA	Output	Send Data A(+)
	4	ERA	Output	Data Terminal Ready A(+)
	5	SG	-	Signal Ground
	6	CSB	Input	Send Possible B(-)
	7	SDB	Output	Send Data B(-)
	8	CSA	Input	Send Possible A(+)
	9	ERB	Output	Data Terminal Ready B(-)
	Shell	FG	-	Frame Ground (Common with SG)

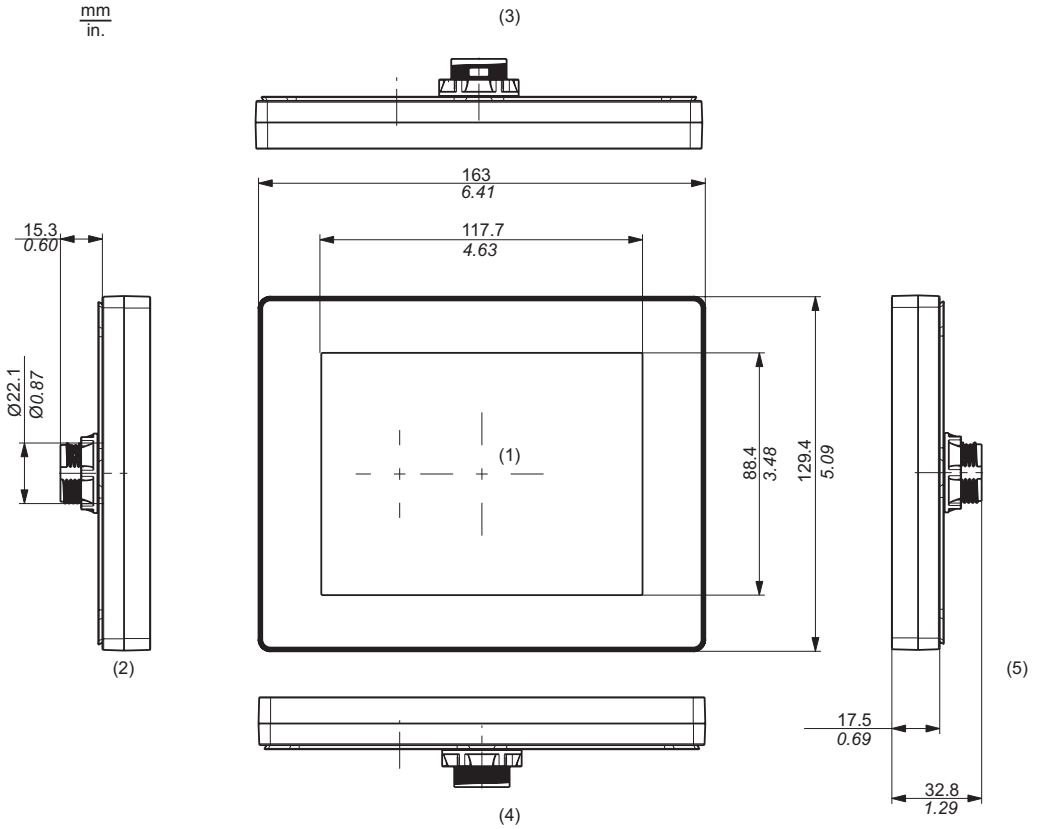
3.4 Dimensions

Display Module GP-4201TM



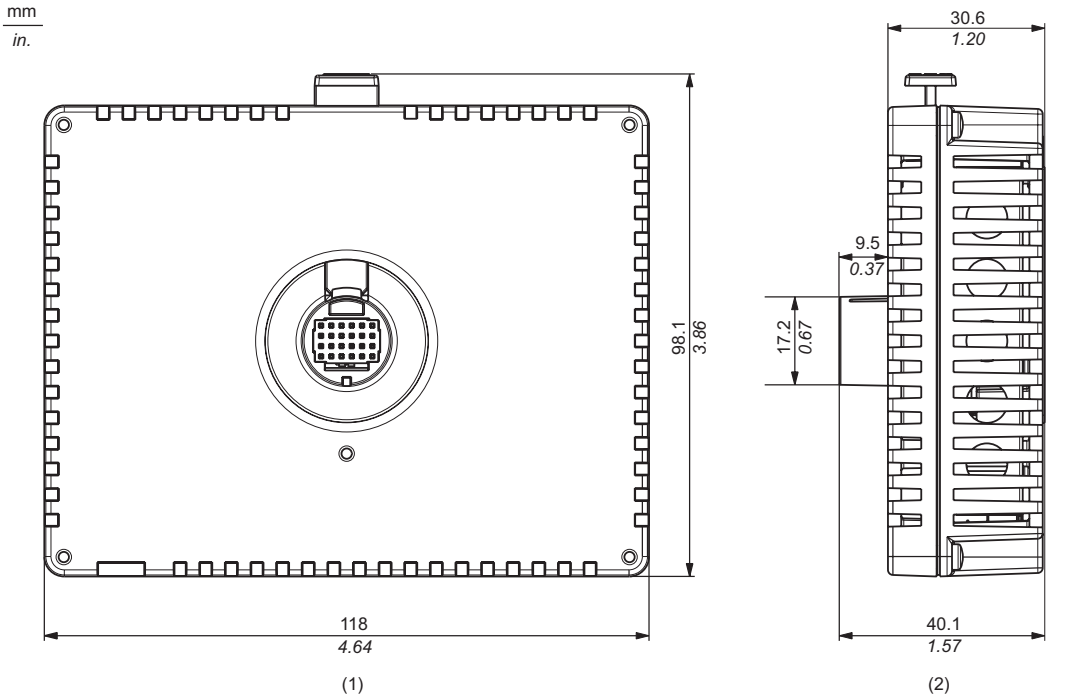
(1) Front
(2) Left Side
(3) Top

Display Module GP-4301TM



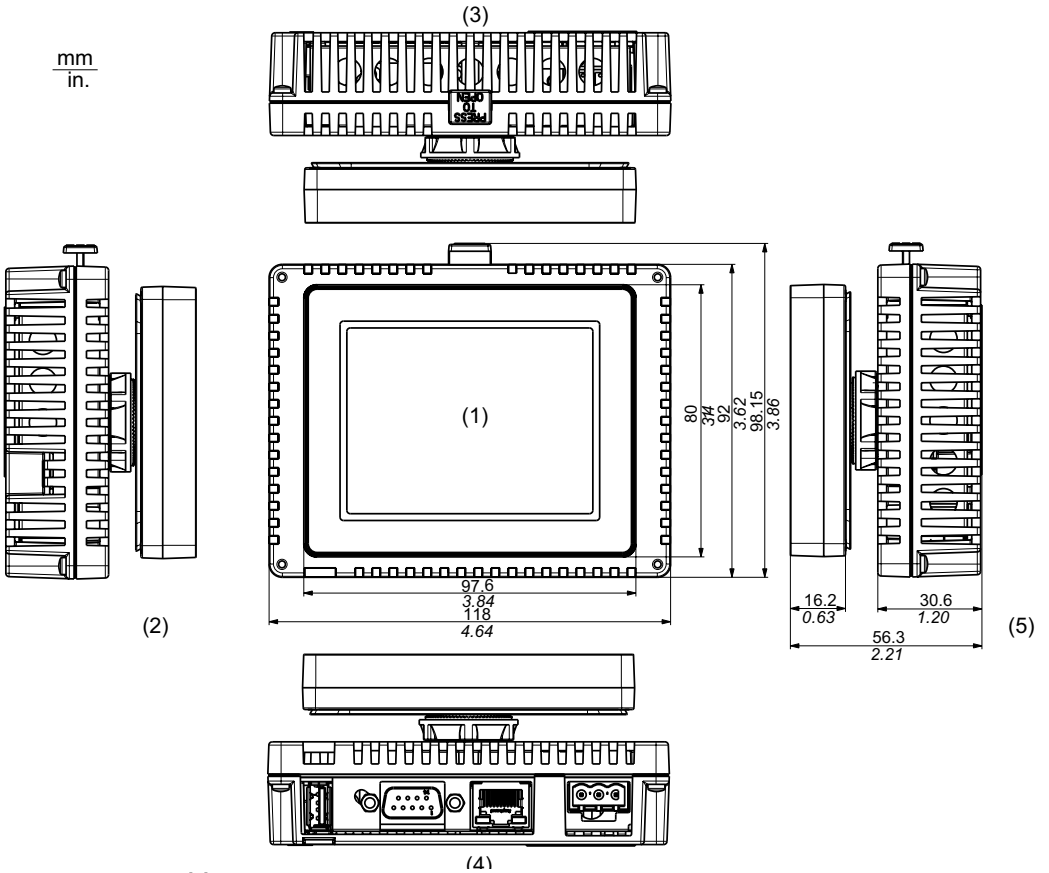
(1) Front
(2) Left Side
(3) Top
(4) Bottom
(5) Right Side

Rear Module (for all GP units)



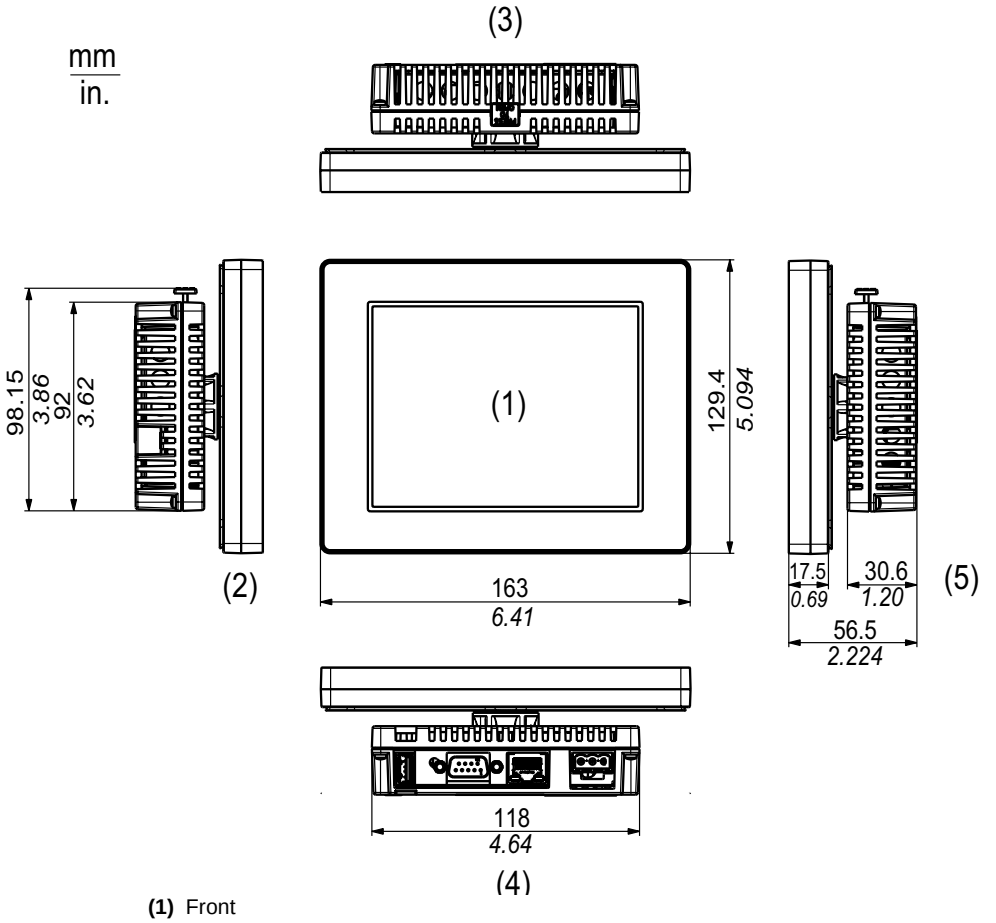
(1) Front
(2) Right Side

Display and Rear Modules GP-4201TM



(1) Front
(2) Left Side
(3) Top
(4) Bottom
(5) Right Side

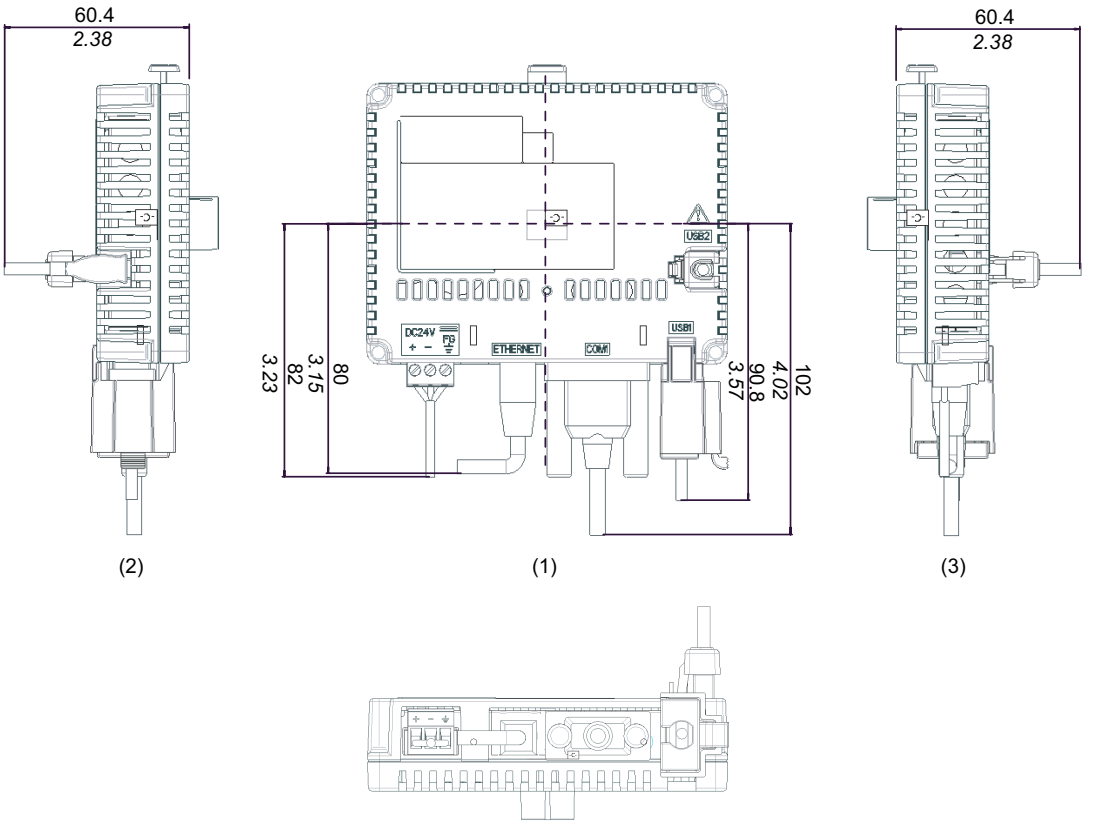
Display and Rear Modules GP-4301TM



(1) Front
(2) Left Side
(3) Top
(4) Bottom
(5) Right Side

Cable Attached Dimensions

mm
in.



(1) Rear
(2) Left Side
(3) Right Side
(4) Bottom

NOTE:
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.

Installation and Wiring

4

Overview

This chapter describes the installation procedures and the wiring principles for GP unit.

What's in this Chapter?

This chapter contains the following sections:

4.1 Installation

Overview

This section describes the installation Procedures for GP unit.

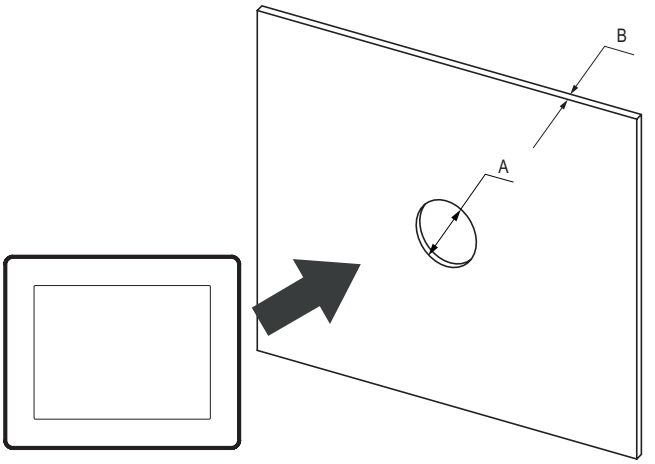
What's in this Section?

This section contains the following topics:

Panel Cut-out Dimensions and Installation

Inserting a GP unit Without an Anti-rotation Tee

Create a panel cut-out and insert the display module of the unit into the panel from the front. The following illustration shows the panel cut-out for a GP unit without a tee:



Dimensions

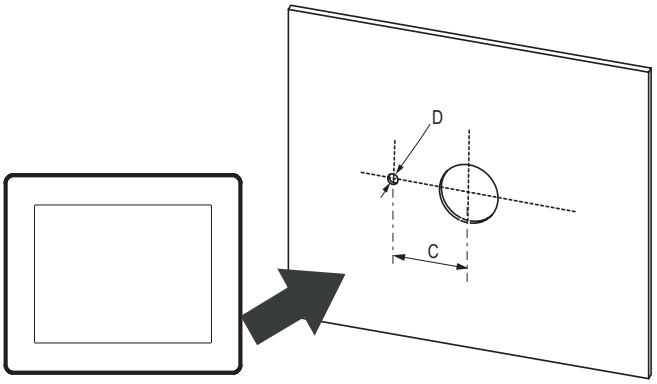
Unit	A (mm)	A (in.)	B (mm) (1)	B (in.) (1)	B (mm) (2)	B (in.) (2)
GP-4201TM GP-4301TM	+0 22.50 -0.30	+0 0.88 -0.01	1.5 to 6	0.06 to 0.23	3 to 6	0.11 to 0.23
The Material of the panel **(1)** Steel sheet **(2)** Glass fiber reinforced plastics (minimum GF30)						

NOTE: Without the tee option, the rotating torque that can be supported by the display module is 2.5 N•m (22.12 in-lb).

Inserting a GP unit With an Anti-rotation Tee

NOTE:
An Anti-rotation Tee is included in the package. It's appropriate for installing the GP unit horizontally into the panel.

Create a panel cut-out and insert the display module of the unit into the panel from the front. The following illustration shows the panel cut-out for a GP unit using a tee:

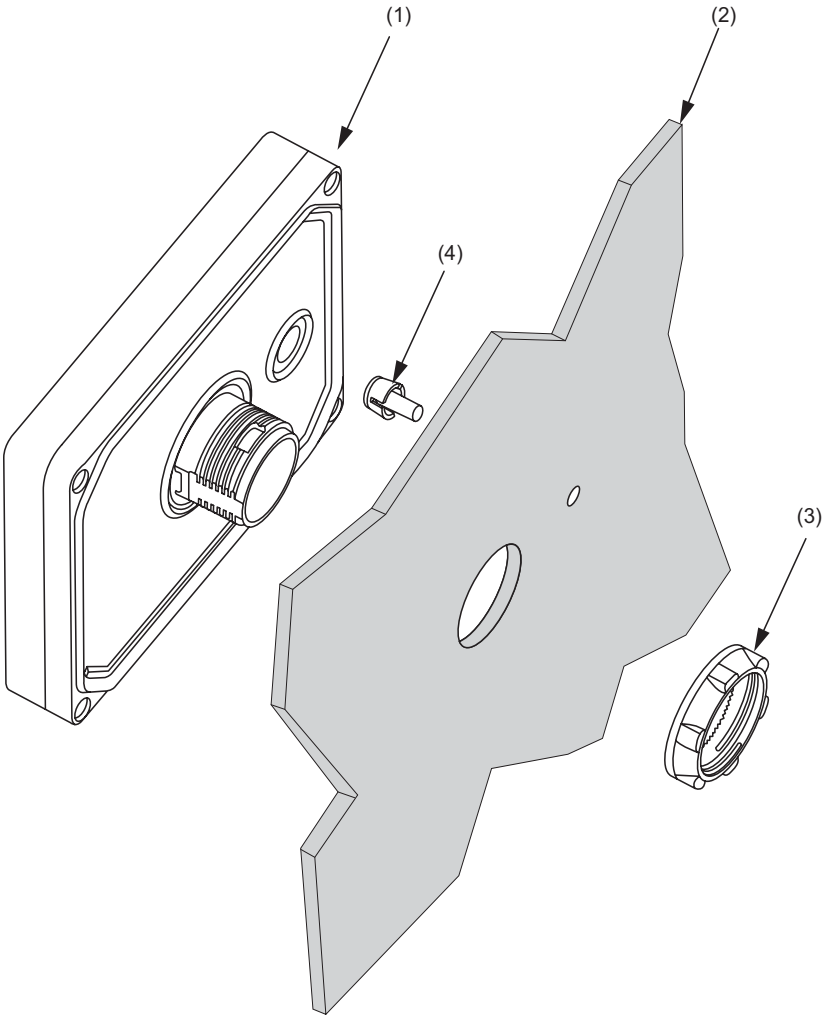


Dimensions

Unit	C (mm)	C (in.)	D (mm)	D (in.)
GP-4201TM GP-4301TM	+0 30.00 -0.20	+0 1.18 -0.007	+0 4.00 -0.20	+0 0.15 -0.007

NOTE: With the tee option, the rotating torque is 6 N•m (53.10 in-lb).

Illustration



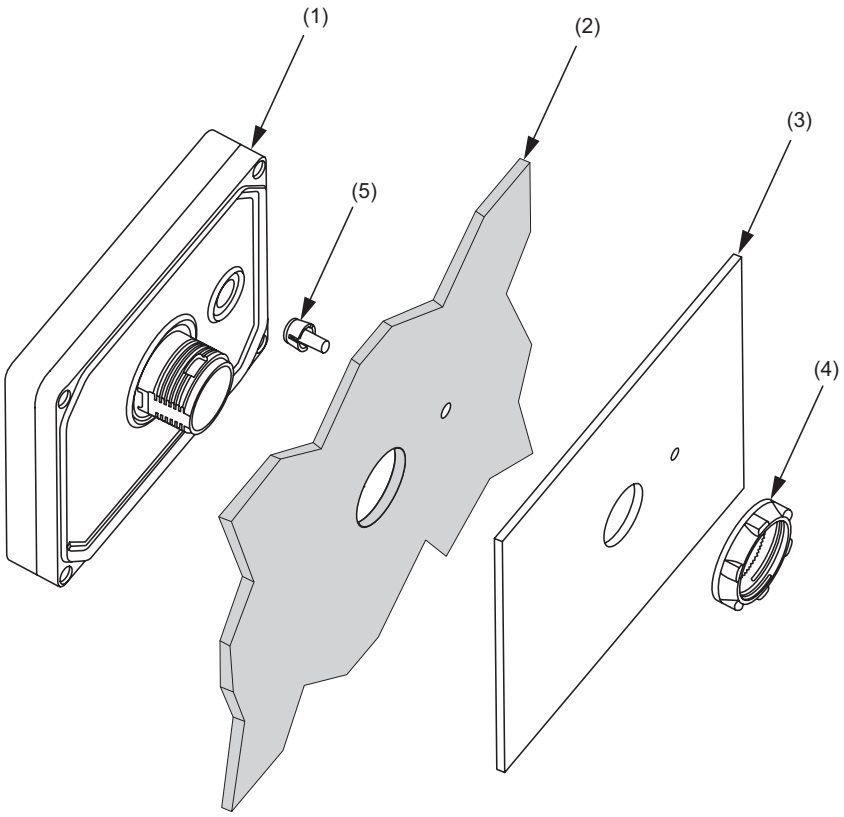
(1) Display module
(2) Panel
(3) Display Installation Nut
(4) Anti-rotation tee

2mm-hight spacer

The Spacer, supplied in the *Accessories kit (sold separately) (see page 25)*, allows mounting the product on a following panel.

Material	GP-4201TM	GP-4301TM
Steel sheet	1 to 1.5 mm (0.04 and 0.06 in.)	1 to 1.5 mm (0.04 and 0.06 in.)
Glass fiber reinforced plastics (minimum GF30)	1 to 3 mm(0.04 to 0.12 in.)	2 to 3 mm (0.08 to 0.12 in.)
Glass fiber reinforced plastics (minimum GF30)	1 to 3 mm(0.04 to 0.12 in.)	2 to 3 mm (0.08 to 0.12 in.)
Other plastic	1 to 3 mm(0.04 to 0.12 in.)	not possible

The following illustration shows the assembly with the panel adaptor:



(1) Display module
(2) Panel
(3) Panel adaptor
(4) Display Installation Nut
(5) Anti-rotation tee

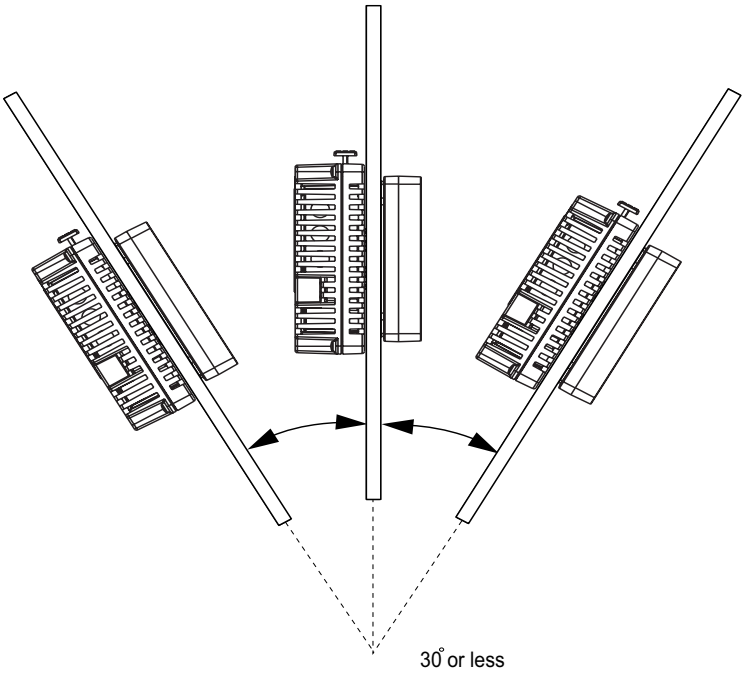
Installation Procedures

Panel Setup Procedure

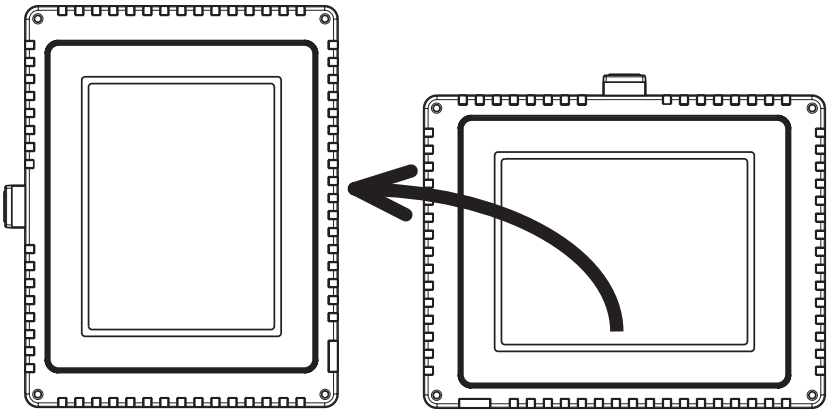
Mount the unit in an enclosure that provides a clean, dry, robust and controlled environment (IP65f enclosure or UL508 4x, if indoors.) *(see page 28)*

Before installing the GPunit verify that:

- The gasket is flat and not damaged.
- The installation panel or cabinet surface is flat (planarity tolerance: 0.5 mm (0.019 in.)), in good condition and has no jagged edges. Metal reinforcing strips may be attached to the inside of the panel, near the panel cut-out, to increase the rigidity.
- The panel must be designed to avoid any induced vibration resonance on the rear module exceeding a punctual factor of 10 and to avoid any induced permanent vibration resonance.
  To reduce the resonance use the spacer supplied in the Accessories kit (sold separately).
- The ambient operating temperature and the ambient humidity are within their specified ranges *(see page 28)*.
- The heat from surrounding equipment does not cause the unit to exceed its specified operating temperature *(see page 28)*.
- The panel face is not inclined more than 30° when installing the unit in a slanted panel:

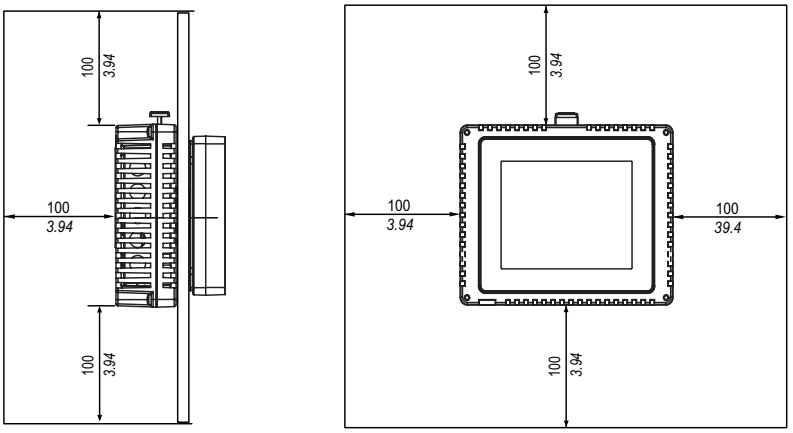


- When mounting the GP unit vertically, ensure that the right side of the unit faces up (i.e. the yellow button should be at the left).

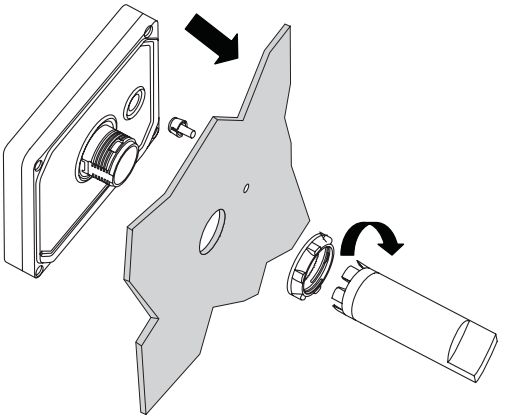
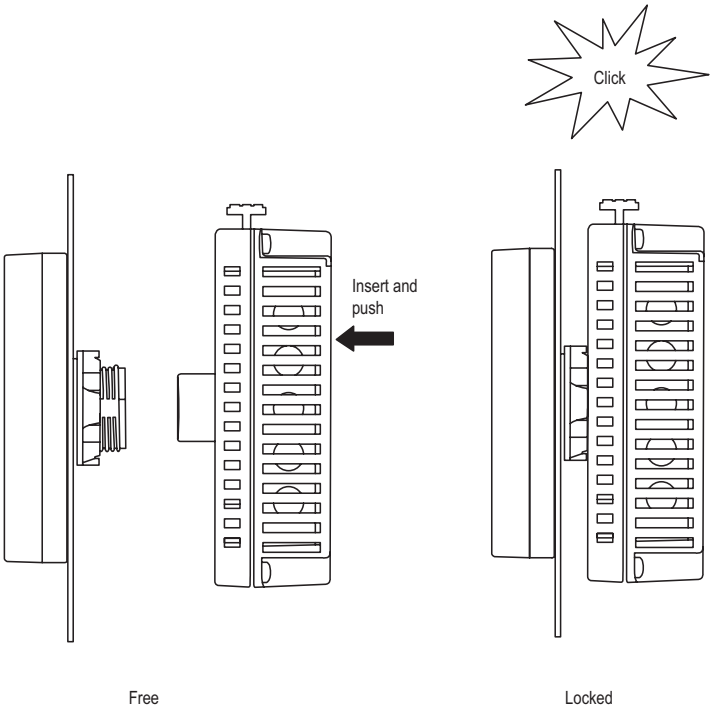


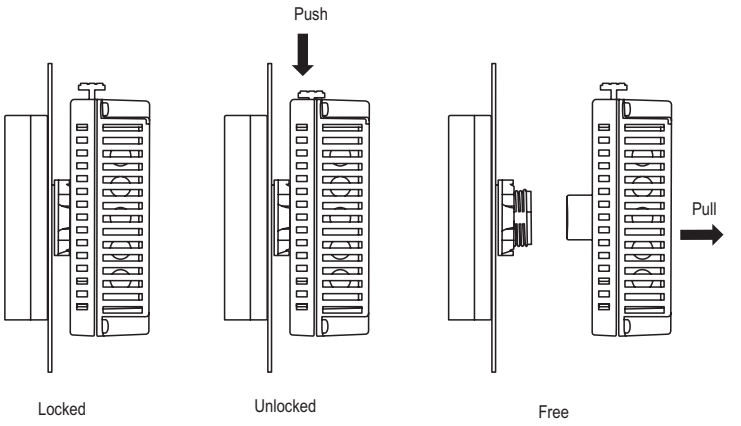
- The unit is at least 100 mm (3.94 in.) away from adjacent structures and other equipment for easier maintenance, operation and improved ventilation:

mm
in.



Step	Action
1	Place the unit on a clean and level surface with the display panel facing downward.
2	The support thickness depends on the material: ● Steel: 1.5 to 6 mm (0.06 to 0.23 in.) ● Glass fiber reinforced plastics (minimum GF30): 3 to 6 mm (0.11 to 0.23 in.) If the panel thickness is less than the above values, use the spacer in Accessories kit (sold separately). For the panel thickness and materials when using the spacer, please refer to "2mm-hight spacer" (see page *48*).
3	Create the correct sized holes required to install the unit, using the Panel Cut-out Dimension and Installation *(see page 45)*. **NOTE:** The field wiring opening for controller when mounted onto an enclosure shall have an area of not more than 775 mm^2 (1.2 in^2).

Step	Action
4	Insert the display module (with Tee, if used) into the panel hole:  Screw the nut with the socket wrench with a torque between 1.2 and 2 N•m (10.62 and 17.70 in-lb.).
5	Insert and push the rear module until it locks into place: **NOTE:** Install the display module and the rear module in the orientation shown in the illustration. If either unit is installed incorrectly, the connector may be damaged. 

Step	Action
6	To remove the rear module, push the yellow button to unlock it, then pull the rear module out: 

4.2 Wiring Principles

Overview

This section presents GP unit wiring principles.

What's in this Section?

This section contains the following topics:

Connecting the Power Cord

⚠ WARNING

HAZARD OF ELECTRIC SHOCK

- When the frame ground (FG) terminal is connected, verify the wire is grounded. Not grounding the unit can result in excessive Electromagnetic Interference (EMI). Grounding is required to meet EMC level immunity.
- Remove power before wiring to the power terminals of the unit.
- The unit uses only 24 Vdc power. Using any other level of power can damage both the power supply and the unit.
- Since there is no power switch on the GP unit, be sure to attach a breaker-type switch to its power cord.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

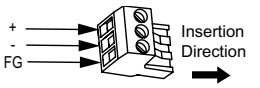
NOTE:
The shield ground (SG) and FG terminals are connected internally in the unit.

Power Cord Preparation

Before using your power cord:

- Verify the ground wire is the same gauge or heavier than the power wires.
- Do not use aluminum wires for the power cord for power supply.
- If the conductor end (individual) wires are not twisted correctly, the end wires may either short loop to each other or against an electrode. To avoid this, use D25CE/AZ5CE cable ends.
- Use wires that are 0.75 to 2.5mm2 (18 -12AWG) for the power cord, and twist the wire ends before attaching the terminals.
- The conductor type is solid or stranded wire.
- To reduce electromagnetic noise, make the power cord as short as possible.

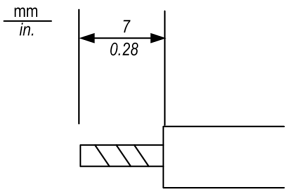
DC Power Supply Connector Illustration



Connection	Wire
+	24 V
-	0 V
FG	Grounded terminal connected to the unit chassis

How to connect the Power Cord

The following table explains how to connect the DC power supply connector :

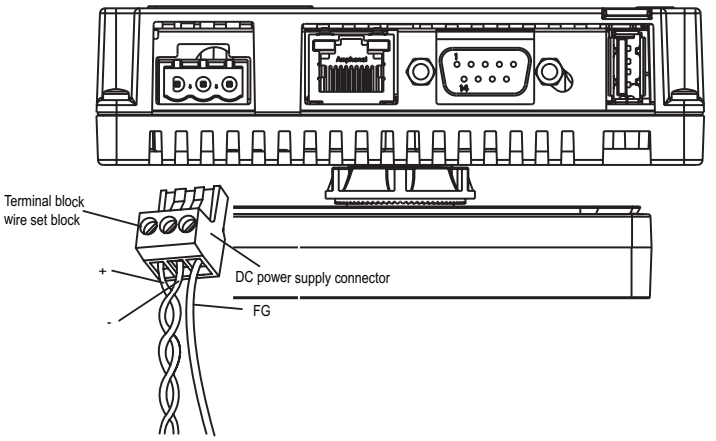
Step	Action
1	Remove the power cord from the power supply.
2	Remove the DC power supply connector from the unit.
3	Remove 7 mm (0.28 in.) of the vinyl cover of each of the power cord wires. 
4	If using stranded wire, twist the ends. Tinning the ends with solder reduces the risk of fraying and enhances electrical transfer.
5	Connect the wires to the DC power supply connector by using a flat-blade screwdriver (Size 0.6 x 3.5).
6	Torque the mounting screws: 0.5 to 0.6 N•m (4.4 to 5.2 lb-in).
7	Replace the DC power supply connector to the power connector on the side of the unit.

NOTE:

- Do not solder the wire directly to the power receptable pin.
- The power supply cord must meet the specification shown above. Twist the power cords together, up to the DC power supply connector, for EMC cancellation. (See illustration as shown below).

Power Connection

The following illustration displays a connection of the power cord:



Connecting the Power Supply

Precautions

- Connect the power cord to the power connector on the side of the unit using the DC power supply connector.
- Use a regulated power supply with a Class 2 power supply between the line and the ground.
- Do not bundle the power supply cord with, or keep close to, main circuit lines (high voltage, high current), or input/output signal lines.
- Connect a lightning surge absorber to handle power surges.

Excessive stress on the power connection or attempting to install a unit with the power cables connected may disconnect or cause damage to the power connections. This can cause short circuits, fire or unintended equipment operation.

⚠ WARNING

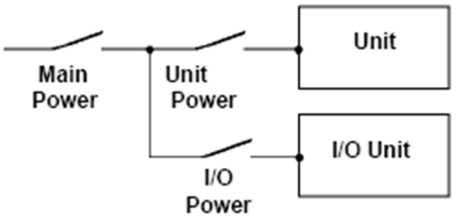
SHORT CIRCUITS, FIRE, OR UNINTENDED EQUIPMENT OPERATION

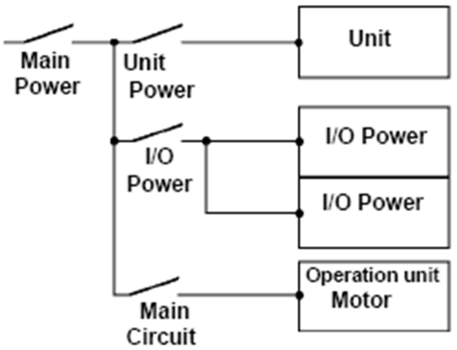
- Securely attach power cables to the panel or cabinet.
- Use the designated torque to tighten the unit terminal block screws.
- Install and fasten unit on installation panel or cabinet prior to connecting Power Supply and Communication lines.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Power Supply Connections

For ease of maintenance, use the following optional connection diagram to set up your power supply connections.

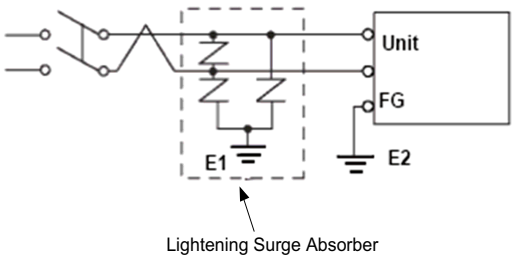




NOTE:

- Ground the surge absorber (E1) separately from the unit (E2).
- Select a surge absorber that has a maximum circuit voltage greater than the peak voltage of the power supply.

The following diagram displays a lightning surge absorber connection:



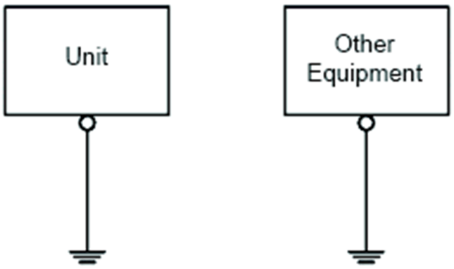
Grounding

Introduction

Take the following precautions for grounding the unit.

Exclusive Grounding

Connect the frame ground (FG) terminal on the power plug to an exclusive ground.



Grounding Procedure

Step	Action
1	Check that the grounding resistance is less than 100 Ω.
2	Create the connection point as close to the 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.

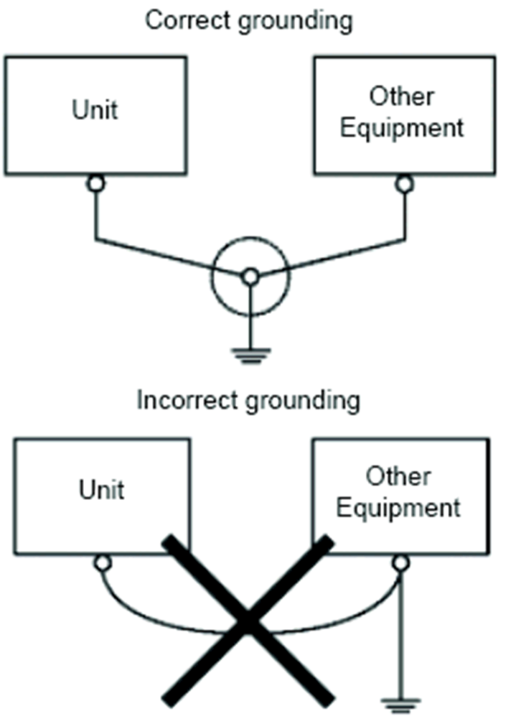
Common Grounding

Precautions:

Electromagnetic Interference (EMI) can be created if the devices are improperly grounded. Electromagnetic Interference (EMI) can cause loss of communication.

Do not use common grounding, except for the authorized configuration described below.

If exclusive grounding is not possible, use a common connection point.



4.3 USB Interface

Overview

This section presents the USB interface.

What's in this Section?

This section contains the following topics:

Important Considerations When Using the USB interface

Introduction

Data transfer cable (ZC9USCBMB1) can be attached to the USB interface to allow data transfer from the computer to the unit.

⚠ WARNING

RISK OF EXPLOSION IN HAZARDOUS LOCATIONS

In hazardous locations as described in UL1604 and ANSI/ISA - 12.12.01:

- confirm that the USB cable has been attached with the USB cable clamp before using the USB host interface.
- remove power before attaching or detaching any connector(s) to or from the unit.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

USB Data Transfer Cable (ZC9USCBMB1) - USB Driver Installation

Important information

Follow the procedure described below to avoid damage to the cable connector or the unit:

- Do not connect the USB data transfer cable until told to do so in the instructions.
- Insert the connector at the correct angle when connecting the USB data transfer cable to the PC or to the unit.
- Hold the connector, not the cable itself when disconnecting the cable.
- Use the port designated during installation. If the cable is unplugged from the port designated during installation and connected to a different port, the OS (Operating System) will not recognize the new port.
- Restart the PC and quit all resident applications before re-installing the software if the installation does not complete successfully.

NOTE: For transfer methods, refer to the following manual: GP-Pro EX Reference Manual "Transferring Project Files via USB Transfer Cable".

USB (Type A) interface

Introduction

When using a USB device, you can attach a USB clamp to the USB interface to prevent the USB cable from being disconnected.

⚠ WARNING

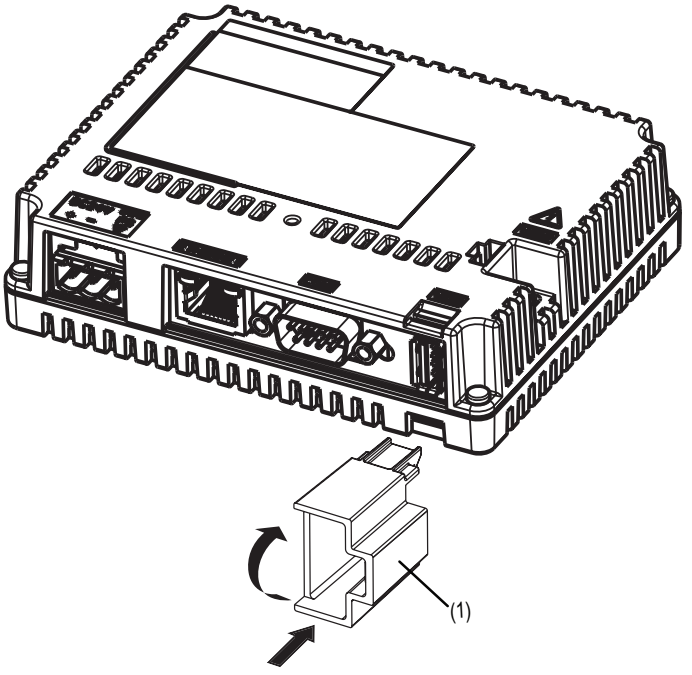
RISK OF EXPLOSION IN HAZARDOUS LOCATIONS

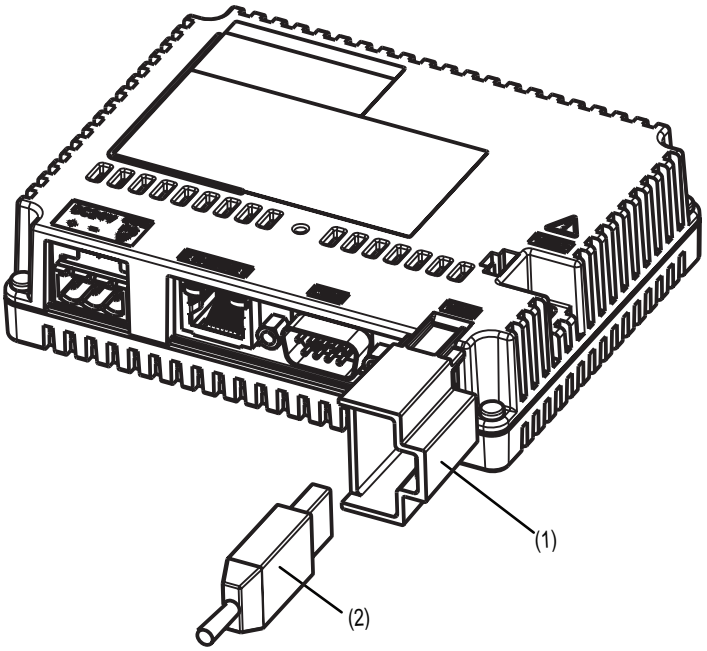
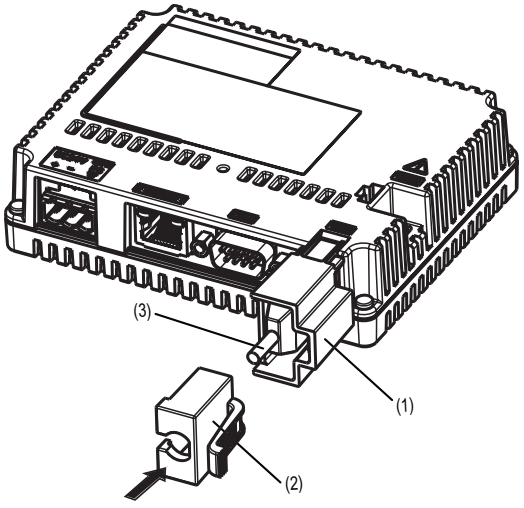
In hazardous locations as described in UL1604 and ANSI/ISA - 12.12.01:

- confirm that the USB cable has been attached with the USB cable clamp before using the USB host interface.
- remove power before attaching or detaching any connector(s) to or from the unit.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

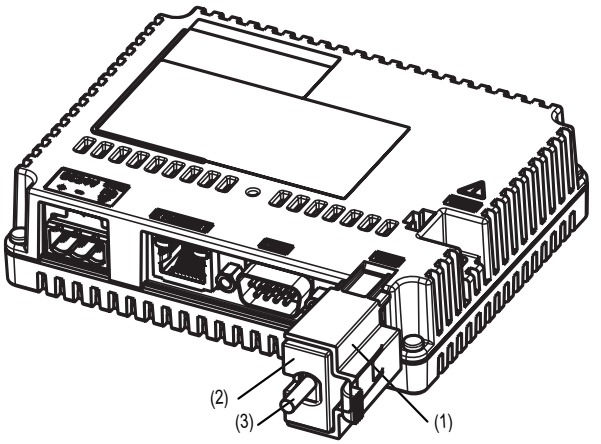
Attaching the USB Clamp

Step	Action
1	Attach the USB holder to the USB Host Interface on the rear module. Hook the upper pick of the USB holder to the attachment hole of the main unit, and insert the lower pick as shown below to fix the USB holder.  **(1)** USB Holder

Step	Action
2	Insert the USB cable into the USB host interface.  **(1)** USB Holder **(2)** USB Cable
3	Attach the USB cover to fix the USB cable in place. Insert the USB cover into the tab of the USB holder.  **(1)** USB Holder **(2)** USB Cover **(3)** USB Cable

Removing the USB Clamp

Push down the tab of the USB holder and then remove the USB cover.



(1) USB Holder
(2) USB Cover
(3) USB Cable

USB (mini-B) interface

Introduction

When using a USB device, you can attach a USB holder to the USB interface to prevent the USB cable from being disconnected.

⚠ WARNING

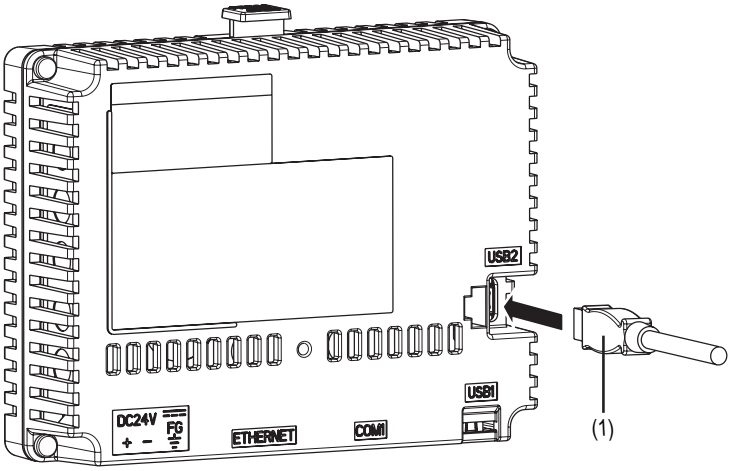
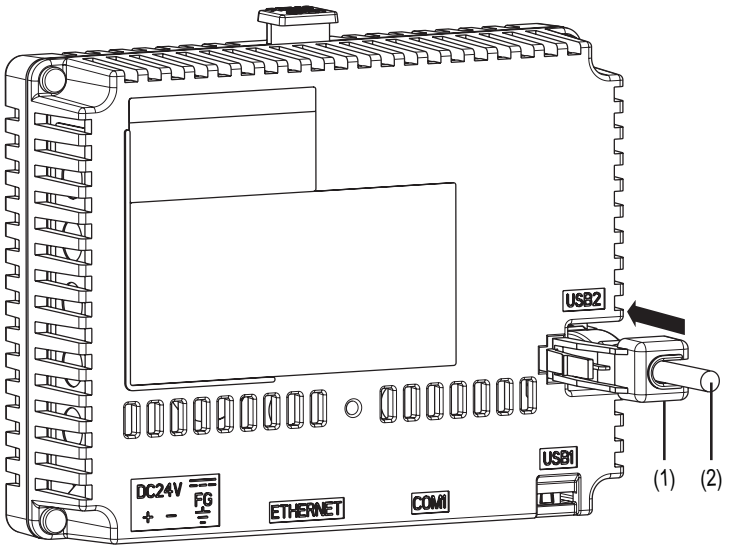
RISK OF EXPLOSION IN HAZARDOUS LOCATIONS

In hazardous locations as described in UL1604 and ANSI/ISA - 12.12.01:

- The USB mini-B connector is for temporary connection only during maintenance and setup of the device. Do not use, connect, or disconnect USB mini-B cable unless area is known to be non-hazardous.
- remove power before attaching or detaching any connector(s) to or from the unit.

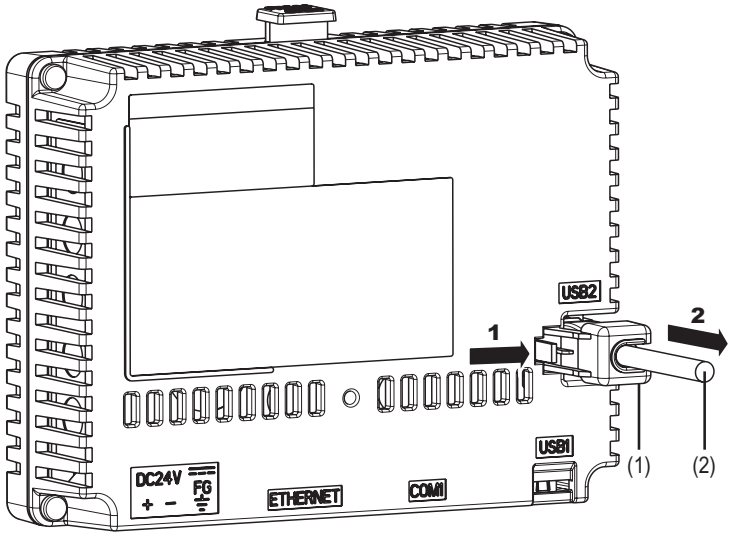
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Attaching the USB Clamp

Step	Action
1	Insert the USB cable into the USB host interface.  **(1)** USB Cable
2	Attach the USB holder to fix the USB cable in place.  **(1)** USB Holder **(2)** USB Cable

Removing the USB Clamp

Push down the tab of the USB holder and then remove the USB holder.



(1) USB Holder
(2) USB Cable

Maintenance

5

Overview

This chapter explains how to maintain your GP unit.

What's in this Chapter?

This chapter contains the following topics:

Regular Cleaning

Cleaning the display

CAUTION
EQUIPMENT DAMAGE ● Power off the unit before cleaning it. ● Do not use hard or pointed objects to operate the touch panel, since it can damage the panel surface. ● Do not use paint thinner, organic solvents, or a strong acid compound to clean the unit. **Failure to follow these instructions can result in equipment damage.**

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.

Periodic Check Points

Operation Environment

Refer to the Environmental Specifications *(see page 28)*.

Electrical Specifications

The input voltage must be within 20.4 to 28.8 Vdc.

Related Items

- Are all power cords and cables connected properly? Are there any loose cables?
- Display Installation Nut holding the unit securely?
- Are there scratches or traces of dirt on the installation gasket?

NOTE: A gasket with scratches or dirt could have lost much of its water resistance. Be sure to change the gasket for water resistance equivalent to IP65f when scratches or dirt become visible.