

# Essential Safety Precautions

## WARNINGS

### System Design

- Do not create GP touch panel switches that could possibly endanger the safety of equipment and personnel. Damage to the GP, its I/O unit(s), cable(s), and other related equipment can cause an output signal to remain continuously ON or OFF and possibly cause a major accident. Therefore, design all monitoring circuits using limit switches, etc. to detect incorrect device movement. To prevent accidents related to incorrect device movement. To prevent accidents related to incorrect signal output or operation, design all switches used to control vital machine operations so they are operated via a separate control system.
- Do not create switches used to control machine safety operations, such as an emergency stop switch, as a GP touch screen icon. Be sure to install these switches as separate hardware switches, otherwise severe bodily injury or equipment damage can occur.
- Please design your system so that equipment will not malfunction due to a communication fault between the GP and its host controller. This is to prevent any possibility of bodily injury or material damage.
- Do not use the GP unit as a warning device for critical alarms that can cause serious operator injury, machine damage or production stoppage. Critical alarm indicators and their control/activator units must be designed using stand-alone hardware and/or mechanical interlocks.
- The GP is not appropriate for use 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, non-life support related medical devices, etc. redundant and/or failsafe system designs should be used to ensure the proper degree of reliability and safety.
- After the GP's backlight burns out, unlike the GP's "Standby Mode", the touch panel is still active. If the operator fails to notice that the backlight is burned out and touches the panel, a potentially dangerous machine miss-operation can occur. Therefore, do not use GP touch switches for the control of any equipment safety mechanisms, such as Emergency Stop switches, etc. that protect humans and equipment from injury and damage. If your GP's backlight suddenly turns OFF, use the following steps to determine if the backlight is actually burned out.
  - 1) If your GP is not set to "Standby Mode" and the screen goes blank, your backlight is burned out.
  - 2) Or, if your GP is set to Standby Mode, but touching the screen does not cause the display to reappear, your backlight is burned out.Also, to prevent accidental machine miss-operation, Pro-face suggests you use the GP's built-in "USE TOUCH PANEL AFTER BACKLIGHT BURNOUT" feature, that will automatically detect a burnout and disable the touch screen.
- The Emergency Switch and the 3-Position Enable Switch do NOT guarantee the operator's complete personal safety. Be sure to design your system so that it ensures the operator's complete personal safety.

### Installation

- High voltage runs through the GP. Except for replacing the backlight, never disassemble the GP, otherwise an electric shock can occur.
- Do not modify the GP unit. Doing so may cause a fire or an electric shock.
- Do not use the GP in an environment where flammable gasses are present, since operating the GP may cause an explosion.

### Wiring

- To prevent an electric shock, be sure to confirm that the GP's power cord is not connected to the main power when connecting any cords, cables or lines to the GP.
- Do not use power beyond the GP's specified voltage range. Doing so may cause a fire or an electric shock.

### Maintenance

- The GP uses a lithium battery for backing up its internal clock data. If the battery is incorrectly replaced, the battery may explode. To prevent this, please do not replace the battery yourself. When the battery needs to be replaced, please contact your local GP distributor.

# CAUTIONS

## Installation

- Be sure to securely connect all cable connectors to the GP. A loose connection may cause incorrect input or output.

## Wiring

- Ground the GP's FG line separately from other units' FG lines. Putting these FG lines too close may cause an electric shock or unit malfunction. Be sure to use a grounding resistance of 100Ω or less and a 2mm<sup>2</sup> or thicker wire, or your country's applicable standard.
- Correctly wire the GP, be sure that the rated voltage and terminal layout are within the designated range. If the voltage supplied differs from the rated voltage, or incorrect wiring or grounding is performed, it may cause a fire or unit malfunction.
- Be careful that metal filings and wiring debris do not fall inside the GP, since they can cause a fire, GP malfunction, or incorrect operation.

## Maintenance

- The liquid crystal panel contains a powerful irritant and if for any reason the panel is damaged and this liquid contacts any part of your body, be sure to wash that area with running water for 15 minutes. If any of this liquid enters your eye, flush your eye for 15 minutes with running water and contact a physician.
- Prior to inserting or removing a CF Card, be sure to turn the GP's CF Card ACCESS switch OFF and to confirm that the ACCESS lamp is not lit. If you do not, CF Card internal data may be damaged or lost.
- While a CF Card is being accessed, NEVER turn OFF or reset the GP, or insert or remove the CF Card. Prior to performing these operations, create and use a special GP application screen that will prevent access to the CF Card.
- Pro-face strongly recommends that you use only CF Cards made by the Digital Electronics Corporation. Use of any other vendor's card may fail to satisfy GP's specifications.

## Unit Disposal

- When this unit 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 strike the touch panel with a hard or pointed object, or press on the touch panel with too much force, since it may damage the touch panel or the display.
- Do not install the GP where the ambient temperature can exceed the allowed range. Doing so may cause the GP to malfunction or shorten its operation life.
- Do not restrict or limit the GP's naturally occurring rear-face ventilation, or storing or using the GP in an environment that is too hot.
- Do not use this unit in areas where large, sudden temperature changes can occur. These changes can cause condensation to form inside the unit, possibly causing the unit to malfunction.
- Do not allow water, liquids, metal or charged particles to enter inside the GP's case, since they can cause either a GP malfunction or an electrical shock. (The allowable pollution degree is 2)
- Do not use or store the GP in direct sunlight, or in excessively dusty or dirty environments.
- Do not store or use the unit where strong jolting or excessive vibration can occur.
- Do not store or use the GP where chemicals (such as organic solvents, etc.) and acids can evaporate, or where chemicals and acids are present in the air.  
Corrosive chemicals: Acids, alkalines, liquids containing salt  
Flammable chemicals: Organic Solvents
- Do not use paint thinner or organic solvents to clean the GP.
- Do not store or operate the LCD display in areas receiving direct sunlight, since the sun's UV rays may cause the LCD display's quality to deteriorate.
- Storing this unit in areas at a temperature lower than is recommended in this manual's specifications may cause the LCD display's liquid to congeal, which may damage the panel. Conversely, if the storage area's temperature becomes higher than the allowed level, the LCD's liquid will become isotropic, causing irreversible damage to the LCD. Therefore, be sure to store the panel only in areas where temperatures are within those specified in this manual.
- After turning the GP OFF, be sure to wait a few seconds before turning it ON again. If the GP started too soon, it may not start up correctly.
- Due to the possibility of unexpected accidents, be sure to back up the GP's screen data regularly.

# UL/c-UL(CSA) Approval

The GP2301H-LG41-24V/GP2301H-SC41-24V/GP2401H-TC41-24V are UL/c-UL(CSA) listed products

UL File No. E171486 (UL60950).

**The GP components conform to the following standards:**

- **UL60950 Third Edition** (Safety of Information Technology Equipment)
- **CAN/CSA-C22.2 No. 60950-00** (Safety of Information Technology Equipment)

**GP2301H-LG41-24V (UL Registration Model: 3080028-03)**

**GP2301H-SC41-24V (UL Registration Model: 3080028-02)**

**GP2401H-TC41-24V (UL Registration Model: 3080028-01)**

# CE Marking

The GP2301H-LG41-24V/GP2301H-SC41-24V/GP2401H-TC41-24V are CE marked , EMC compliant products.

These units conform to EN55011 Class A and EN61000-6-2 directives.

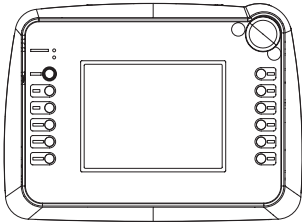
For detailed CE marking information, please contact your local GP distributor.

# Package Contents

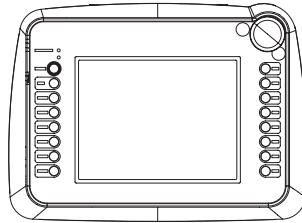
The following items are included in the GP's package. Before using the GP, please confirm that all items listed here are present.

## ■ GP Unit (1)

**GP2301H-LG41-24V/  
GP2301H-SC41-24V**



**GP2401H-TC41-24V**



## ■ Installation Guide (1)

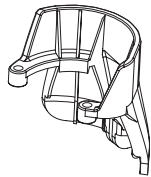
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**GP2301H-LG41-24V  
GP2301H-SC41-24V  
GP2401H-TC41-24V**

## ■ Hand Strap (1)

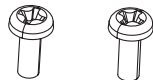


## ■ Emergency Switch Guard (1)

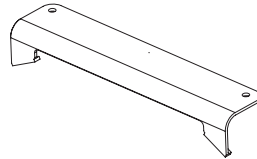


## ■ Emergency Switch Guard

**Attachment Screws (2)**



## ■ CF Card Interface Guard (1)



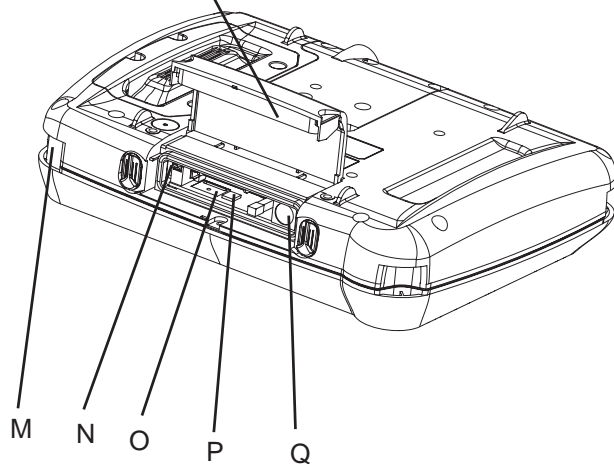
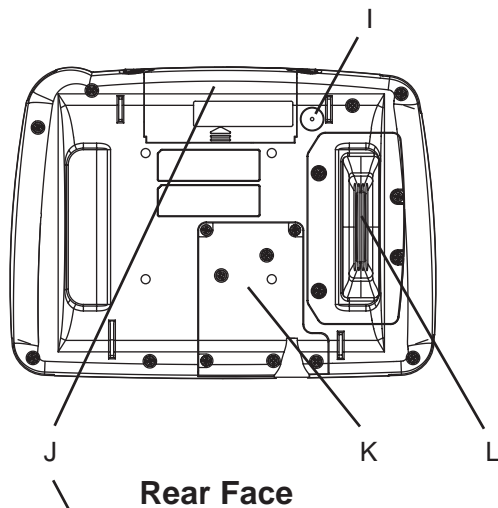
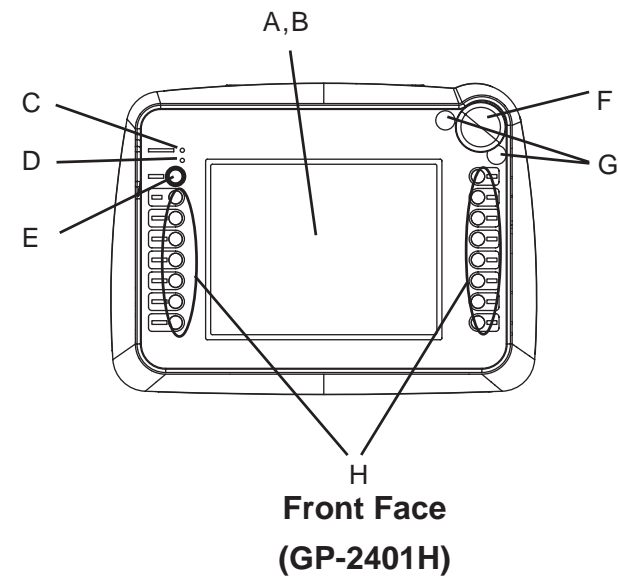
## ■ CF Card Interface Guard

**Attachment Screws (2)**



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.

# 1 Part Names



(with CF Card Cover open)

**A : Display**

**GP-2301HL: Monochrome LCD**

**GP-2301HS: STN LCD**

**GP-2401HT: TFT LCD**

**B : Touch Panel**

**C : Status LED**

LED	GP Status
Not Lit	Power is OFF.
Green	Normal operation
Orange	Backlight is not functioning. (Refer to 13. Changing the Backlight.)

**D : Unit Operation LED**

LED	GP Status
Green	Indicates the Operation Switch or the 3-Position Enable Switch are ON.* <sup>1</sup>
Not Lit	If the unit status is other than the above conditions, and GP-H70 compatibility mode is selected, indicates the Operation Switch and the 3-Position Enable Switch have been operated at the same time.

**E : Operation Switch**

**F : Emergency Switch**

**G : Emergency Switch Guard Hole Covers**

**H : Function Switch**

**GP-2301H: 11 switches**

**GP-2401H: 15 switches**

**I : CF Card Access LED**

**J : CF Card Cover**

**K : Cable Cover**

**L : 3-Position Enable Switch**

**M: Hand Strap Attachment Slot**

**N : CF Card Access Switch**

**O : CF Card I/F**

**P : CF Card Start Switch**

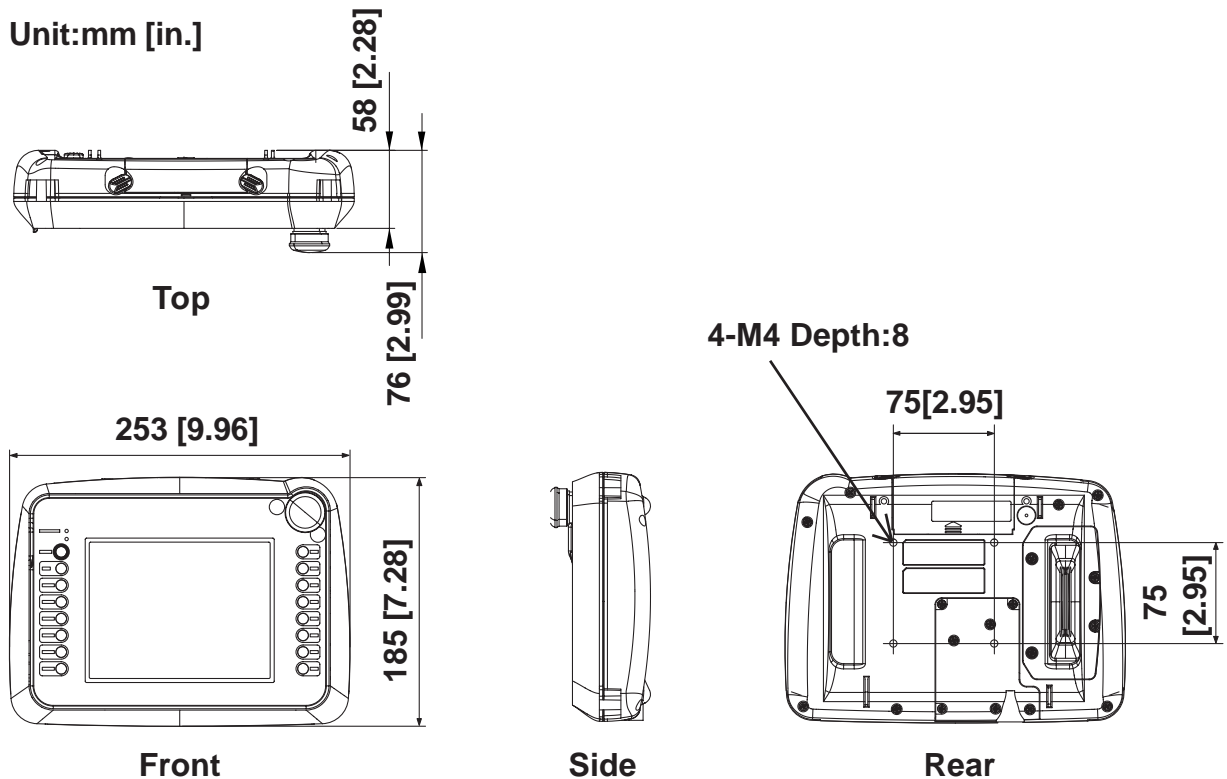
**Q : Tool Connector**

\*1 When GP-H70 compatibility mode is selected.

## 2 Dimensions

Even though only the GP2401H-TC41-24V is shown below, the dimensions of the GP2301H-LG41-24V and the GP2301H-SC41-24V are the same.

Unit:mm [in.]



## 3 Dip Switches

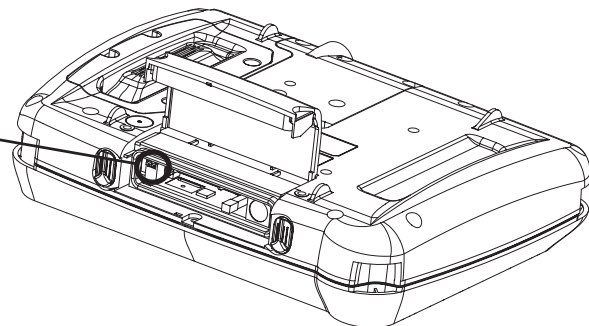
### ■ CF Card Access Switches

The CF Card Access Switches are located inside the rear face CF Card Cover, on the left side of the CF Card insertion slot.



Dip Switches

(Factory Settings)



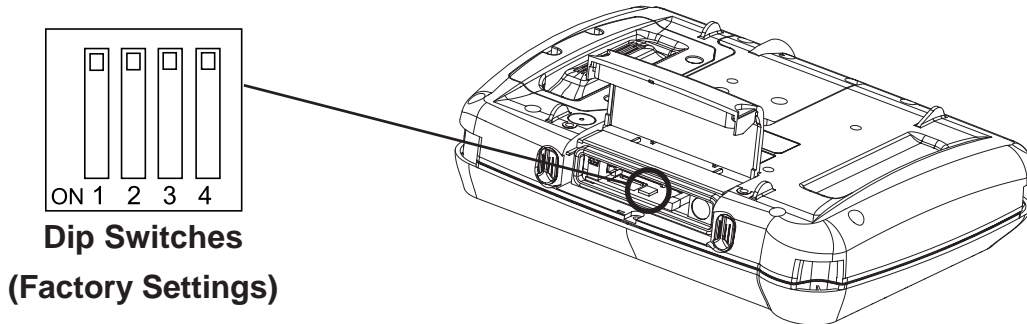
DIP SWITCH	1	2
Description	Controls CF Card access	Reserved
ON	Allows CF Card access	—
OFF	Does not allow CF Card access	—



**Before removing the CF Card, confirm that the CF Card Access Switch is turned OFF and the CF Card Access LED is not lit. If the switch is ON or the LED is lit, removal of the CF Card may result in data loss.**

## ■ CF Card Startup Switches

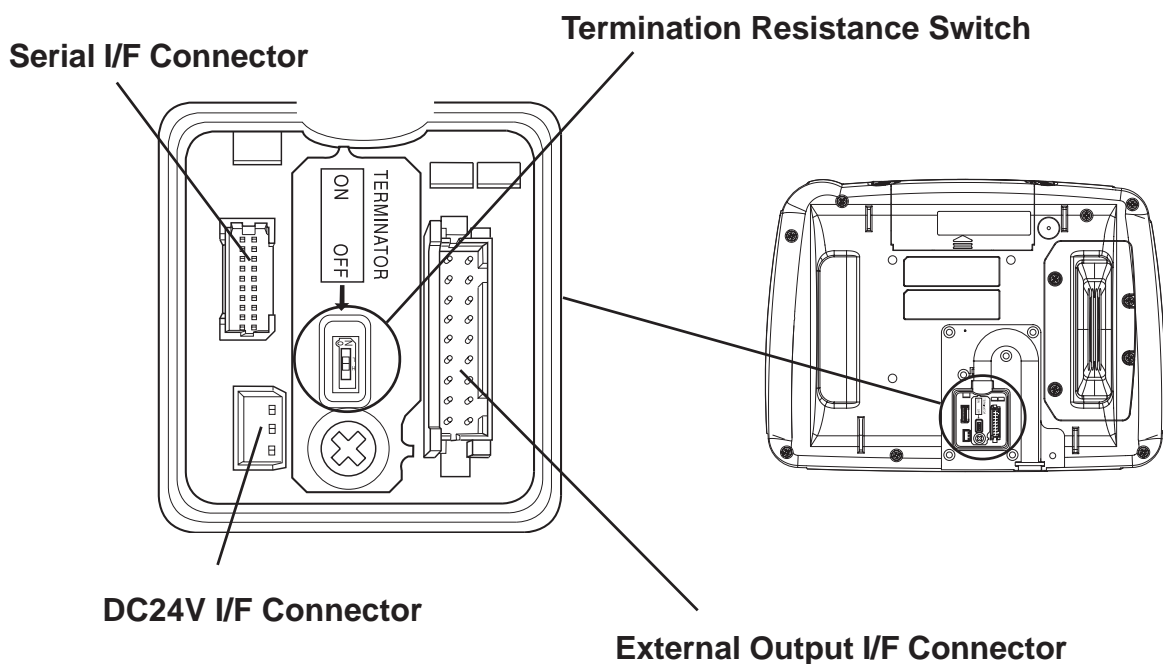
The CF Card Startup Switches are located inside the rear face CF Card Cover, just below the CF Card insertion slot.



Dip Switch	Description	ON	OFF	Note
1	This Dip switch setting controls the startup from a CF Card.	Startup from CF Card is enabled.	Startup from CF Card is disabled.	CF Card with startup data required.
2	Reserved	—	—	—
3	Reserved	—	—	—
4	Reserved	—	—	—

## ■ Termination Resistance Switch

When you need to set the GP unit's termination resistance, this dip switch is used. It is located next to the External Output Interface Connector. Setting it to ON will insert 100Ω of resistance. The factory setting is OFF.



## 4 External Interfaces

This interface is used to connect the GP to the host (PLC), via an RS-232C or RS-422 cable. The connector is located inside the Cable Cover, on the circuit board.



- **When connecting the GP2000H to an external device, be sure to use a Digital Electronic Corporation GP2000H Option Cable.**
- **When attaching the optional Cable Cover, to ensure a water-resistant seal, be sure to tighten all attachment screws to 0.5N•m.**
- **The SG and FG terminals are connected internally in the GP unit.**
- **When connecting the SG line to another device, be sure that the design of the system/connection does not produce a shorting loop.**

### ■ DC24V I/F

This interface is for DC24V input.

	Pin #	Signal Name	Meaning
	1	DC24V	Power input +24V
	2	0V	Power input 0V
	3	FG	Frame ground



**When connecting the FG terminal, the unit will be more susceptible to noise. Be sure to earth (ground) the unit.**

### ■ Serial I/F

This RS-232C/RS-422 interface is used to connect the GP2000H with a Host unit.

	Pin #	Signal Name	Condition
	1	RS	Request to Send (RS-232C)
	2	SD	Send Data (RS-232C)
	3	CS	Clear to Send (RS-232C)
	4	RD	Receive Data (RS-232C)
	5	CD	Carrier Detect (RS-232C)
	6	ER	Enable Receive (RS-232C)
	7	VCC	5V±5% Output 0.25A
	8	SG	Signal Ground
	9	NC	No Connection(Reserved)
	10	NC	No Connection(Reserved)
	11	NC	No Connection(Reserved)
	12	NC	No Connection(Reserved)
	13	RDA	Receive Data A (RS-422)
	14	RDB	Receive Data B (RS-422)
	15	SDA	Send Data A (RS-422)
	16	SDB	Send Data B (RS-422)
	17	CSA	Clear to Send A (RS-422)
	18	CSB	Clear to Send B (RS-422)
	19	ERA	Enable Receive A (RS-422)
20	ERB	Enable Receive B (RS-422)	

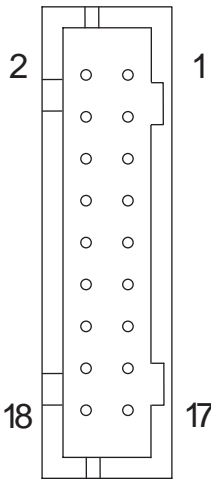


- **Since Pin#7's (VCC) DC5V output is unprotected, be sure to keep the output current within the rated range.**
- **This unit's serial port is not isolated, therefore, it is important that you connect the SG (#8) terminals. If this is not done, the RS422 circuit may be damaged.**



## ■ External Output I/F

Pin #	Signal Name	Meaning
1	NC	No Connection(Reserved)
2	DOUT0.C	DOUT0 output Open Collector DC24V 300mA
3	NC	No Connection(Reserved)
4	DOUT1.C	DOUT1 output Open Collector DC24V 300mA
5	OP.GND	OP. Ground
6	OP.C	OP. Output Open Collector DC24V 300mA
7	DOUT.GND	DOUT Ground
8	BUZZ OUT	External buzzer output
9	EMG0B	Emergency switch 0B (Operates like A contact)
10	EMG0A	Emergency switch 0A (Operates like A contact) Open Collector DC24V 300mA
11	EMG1B	Emergency switch 1B (B contact)
12	EMG1A	Emergency switch 1A (B contact) Rated DC30V 1A (min. applicable load DC5V 1mA)
13	EMG2B	Emergency switch 2B (B contact)
14	EMG2A	Emergency switch 2A (B contact) Rated DC30V 1A (min. applicable load DC5V 1mA)
15	ENB0B	3-Position Enable switch 0B (A contact)
16	ENB0A	3-Position Enable switch 0A (A contact) Rated DC24V 300mA (min. applicable load DC24V 4mA)
17	ENB1B	3-Position Enable switch 1B (A contact)
18	ENB1A	3-Position Enable switch 1A (A contact) Rated DC24V 300mA (min. applicable load DC24V 4mA)



- **#7 (DOUT.GND) is common for #2 (DOUT0.C), #4 (DOUT1.C), and #8 (BUZZ OUT).**
- **When using GP-H70 compatible mode, #17 (ENB1B) and #18 (ENB1A) cannot be used.**

## ■ CF Card Interface

This slot accepts a CF Card.

## ■ 3-Position Enable Switch Interface

This switch/interface changes between GP2000H and GP-H70 compatible modes.

GP-H70 Compatible Mode:

This allows the 3-Position Enable switch on the rear face of the unit to be used as an Operation switch.

When the GP2000H unit's OFFLINE mode is used to set the "Operation" feature to "enable", this switch must be kept pressed in order to use the front face touch panel and function switches.

**Reference** For information about how to set this feature, see the "GP2000H Series User Manual".

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## 5 About the GP2000H Unit

This unit can be attached to a wall or to a commercially available type of arm, if the optional Wall Mount Adaptor is used. This adaptor can be used as follows.

### ■ When Attaching the GP2000H to a Wall

This unit can be attached to a wall, after the Wall Mount Adaptor is attached.

### ■ When Attaching the GP2000H to an Arm

This unit can be attached to a commercial type, VESA FPM PMI approved (75mm) arm, either fixed or wall-mounted.

- VESA: Video Electronics Standard Association
- FPM PMI: Flat Panel Monitor Physical Mounting Interface (physical specification designed by VESA for attachment of a display to either an arm or stand.)

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## 6 DOUT/BUZZ Output Current Direction Change

To change the direction of the current from the GP unit's DOUT/BUZZ output (to Output Source Type), refer to the GP2000H Series User Manual .

Factory settings are for Output Sink Type.

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## 7 CF Card Interface Guard

### ■ CF Card Interface Guard

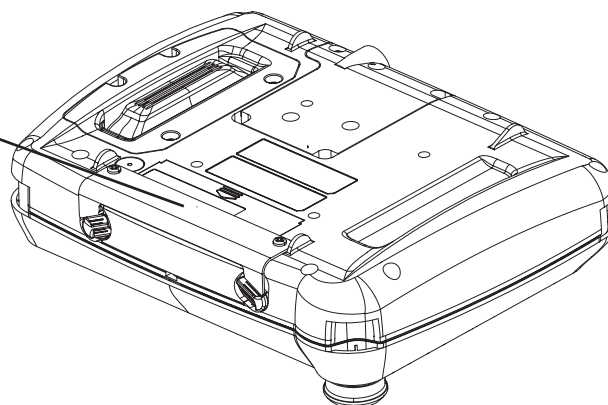
When the GP unit's CF Card Interface Guard is attached to the GP unit, the GP meets NEMA#250 TYPE4X/12 environment requirements.

(Even if the CF Card Interface Guard is not attached, if the CF Card Cover is closed, the unit's protection level is maintained.)

For guard attachment details, refer to

**Reference** GP2000H Series User Manual

CF Card Interface Guard



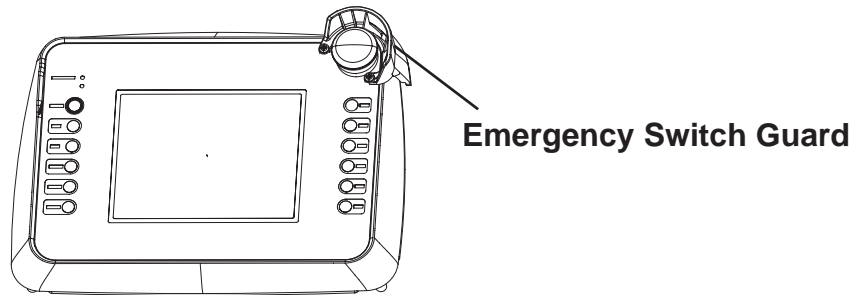
## 8 Emergency Switch Guard

### ■ Emergency Switch Guard

This guard is used to prevent the accidental pressing of the Emergency Stop Switch when the GP2000H unit is placed face down on a table, or is accidentally dropped. This unit is factory equipped with two (2) Emergency Switch Guard Hole Covers (Seals).

For guard attachment details, refer to

**Reference** GP2000H Series User Manual



## 9 Wiring



### WARNINGS

- To avoid an electric shock, prior to connecting the GP's power cord terminals to the power terminal block, confirm that the GP's power supply is completely turned OFF, via a breaker, or similar unit.
- The GP2000H Series units are designed to use only DC24V input. Any other power level can damage both the GP and the power supply.
- Since there is no power switch on the GP unit, be sure to attach a breaker-type switch to its power cord.

When connecting the GP2000H Series units to a Serial I/F, DC24V I/F, or External I/F, be sure to use the Digital Electronics Corporation's GP2000H Series option cables.

Digital's option cables are as follows.

Cable Name	Model Number
RS-232C DSUB Connector 3m Cable	GP2000H-D232-3M
RS-232C DSUB Connector 10m Cable	GP2000H-D232-10M
RS-232C 3m Cable	GP2000H-C232-3M
RS-232C 10m Cable	GP2000H-C232-10M
RS-422 DSUB Connector 3m Cable	GP2000H-D422-3M
RS-422 DSUB Connector 10m Cable	GP2000H-D422-10M
RS-422 3m Cable	GP2000H-C422-3M
RS-422 10m Cable	GP2000H-C422-10M

The following cables are used when using a GP-H70 Series Terminal Block Conversion Adaptor. (GPH70-AP232-O/GPH70-AP422-O)

Cable Name	Model Number
RS-232C DSUB connector 3m Cable	GP2000H-AP70CB-D232-3M
RS-422 DSUB connector 3m Cable	GP2000H-AP70CB-D422-3M

For unit connection information:

**Reference** GP2000H Series User Manual

For Device/PLC connection information:

**Reference** Device/PLC Connection Manual

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## 10 Power Supply Cautions

Please pay special attention to the following instructions when connecting the power cord terminals to the GP unit.

- Between the line and the ground, be sure to use a low noise power supply.
- Input and Output signal lines must be separated from the power control cables for operational circuits.
- To increase the noise resistance, be sure to twist the ends of the power cord wires before connecting it to the GP unit.
- Connect a surge absorber to handle power surges.
- To reduce noise, make the power cord as short as possible.

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## 11 Grounding Cautions

- When attaching a wire to the GP's rear face FG terminal, (on the Power Input Terminal Block), be sure to create an exclusive ground.\*1
- Inside the GP2301H-LG41-24V/GP2301H-SC41-24V/GP2401H-TC41-24V unit, the SG(Signal Ground) and FG(Frame Ground) terminals are connected.
- When connecting the SG line to another device, be sure that the design of the system/connection does not produce a shorting loop.

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## 12 Input/Output Signal Line Cautions

- All GP Input and Output signal lines must be separated from all operating circuit (power) cables.
- If this is not possible, use a shielded cable and ground the shield.

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## 13 Backlight Replacement

GP2000H unit backlights cannot be changed by the User. When a backlight must be changed, please contact your local GP distributor.

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\*1 Use a grounding resistance of 100Ω, a wire of 2mm<sup>2</sup> or thicker, or your country's applicable standard.