



## WARNINGS

- When connecting the PS-400G (hereafter referred to as the "PS-G")'s power cord terminals to the PS-G's Terminal Block, check first that the PS-G's power supply is completely turned OFF, via a breaker, or similar unit.
- Whenever changing the Backlight, to prevent electric shocks and burns, be sure to turn OFF the PS-G's power and wear protective gloves.
- Do not open or remodel the PS-G unit, since it may lead to a fire or electric shock.
- Do not use power beyond the PS-G's specified voltage range. Doing so may cause a fire or an electric shock.
- Do not use the PS-G in an environment where flammable gases are present, since operating the PS-G may cause an explosion.
- The PS-G uses a lithium battery for backing up its internal clock data. If the battery is incorrectly replaced (i.e. its + and - sides are reversed), the battery may explode. When changing the battery, please contact your local PS-G distributor.
- Do not use the PS-G 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.
- Do not use PS-G touch panel switches in life-related or important disaster prevention situations. For safety related switches, such as an emergency switch, be sure to use a separate mechanical switch.
- To prevent operator injury or machine damage, be sure to design your machine operation system so that the machine will not malfunction due to a communication fault between the PS-G and its host controller.
- The PS-G 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 PS-G 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.

### **To prevent this unit from malfunctioning :**

- Do not strike the PS-G's touch panel with a hard or heavy object, or press on the touch panel with too much force, since it may damage the display.
- Do not install the PS-G where the temperature will exceed its specified range.
- Be sure that water, liquids or metal particles do not enter the PS-G, since it may cause a malfunction or a short circuit.
- Avoid installing the PS-G where sudden, large changes in temperature may occur. These changes may cause condensation to form inside the unit, possibly causing a malfunction.
- To prevent excessive heat from building up inside the PS-G, do not install it where its ventilation holes may be blocked. Also, do not install or store the PS-G near high temperature equipment.
- Do not install or store the PS-G where direct sunlight or high levels of dust exist.
- Since the PS-G is a precision instrument, do not install or store it where either strong shocks or excessive vibration may occur.
- Do not install or store the PS-G in an area containing chemicals or chemical fumes.
- Do not use paint thinner or organic solvents to clean the PS-G's case or screen.
- Due to the danger of unforeseeable accidents, back up all PS-G data regularly.
- After turning this unit OFF, be sure to wait a few seconds before turning it ON again. If the unit is started too soon, it may not start up correctly.

# UL/c-UL (CSA) Approval

The PS400G-T41-J124V and PS400G-T41-E124V is a UL/c-UL (CSA) listed product. (UL file No.E182139)

**This unit conforms as a product to the following standards:**

- **UL508**

Industrial Control Equipment

- **UL1604**

Electrical Equipment for use in Class I and II, Division 2, or Class III Hazardous Location, industrial control applications.

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

Standard for Safety of Information Technology Equipment, including Electrical Business Equipment.

**PS-400G-T41-J124V (UL Registration Model: 2880064-02)**

**PS-400G-T41-E124V (UL Registration Model: 2880064-01)**

## <Cautions>

- The PS-G must be used as a built-in component of an end-use product.
- This unit should be installed in the front face of a metal panel.
- If this unit is installed so as to cool itself naturally, be sure to install it in a vertical panel. Also, be sure that the PS-G is mounted at least 50mm away from any adjacent structures or equipment. If these requirements are not met, the heat generated by the PS-G's internal components may cause the unit to fail to meet UL/c-UL standard requirements.

UL1604 Conditions of Acceptability and Handling Cautions:

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

# CE Marking

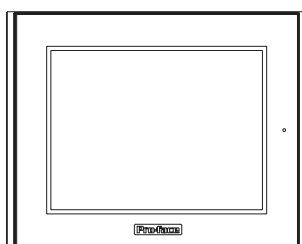
The PS-400G-T41-J124V and PS-400G-T41-E124V is a CE marked product that conforms to EMC directives EN55011 class A and EN61000-6-2 (EN50082-2).

# Package Contents

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

■ PS-G Unit (1)

<PS400G-T41-J124V/PS400G-T41-E124V>



■ Installation Gasket (1)

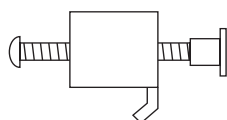


■ Installation Guide (1)

<This Guide>



■ Installation Fasteners (4/set)



■ CD-ROM (1)



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

# CD-ROM Contents

The CD-ROM contains the following items.

Item	Description
PS-400G Series User Manual	PS-G Unit PDF Manual
Acrobat® Reader 5.0	Software to view PDF Files (Self-Extracting Type)

# About The PDF Manual

The CD-ROM contains the following PDF manual file.

- PS-400G Series User Manual (ps400ge.pdf)

Reading a PDF file requires installation of the Adobe Corporation's Acrobat Reader Software.

## ■ Acrobat Reader Installation:

To install the Acrobat Reader software, follow the steps given below.

- 1) This software, in the form of a self-extracting file, is located in this CD-ROM in the folder titled [reader]. Use the Explorer software to find the file [ar505enu.exe], and double-click on the file icon to begin the Reader installation.
- 2) After Installation begins, follow the instructions given on the Installation screens.

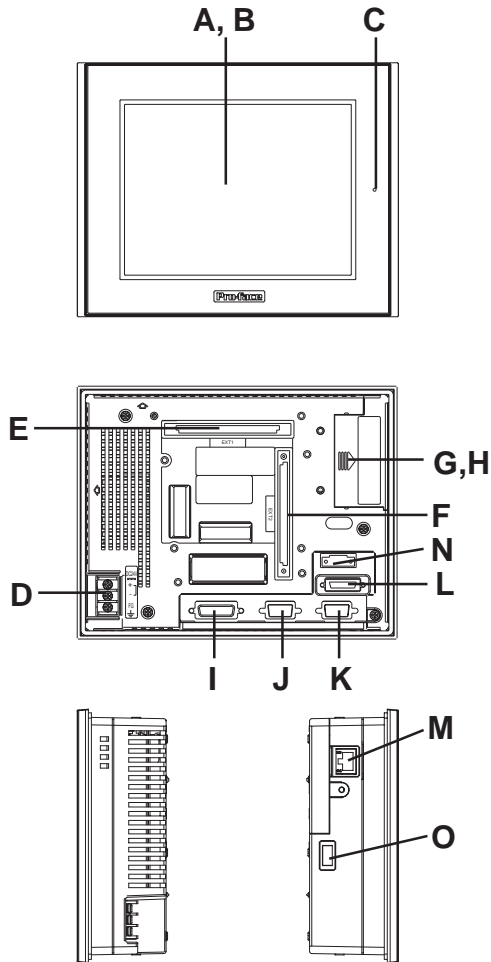
## ■ Viewing the PS-G's PDF manual:

To view the PDF manual contained in this CD-ROM, follow the steps given below.

- 1) Use the Explorer software to locate the file [ps400ge.pdf] in the folder titled [manual].
- 2) Double-click on this file, Acrobat Reader will automatically start and the first page of the PDF manual will appear.

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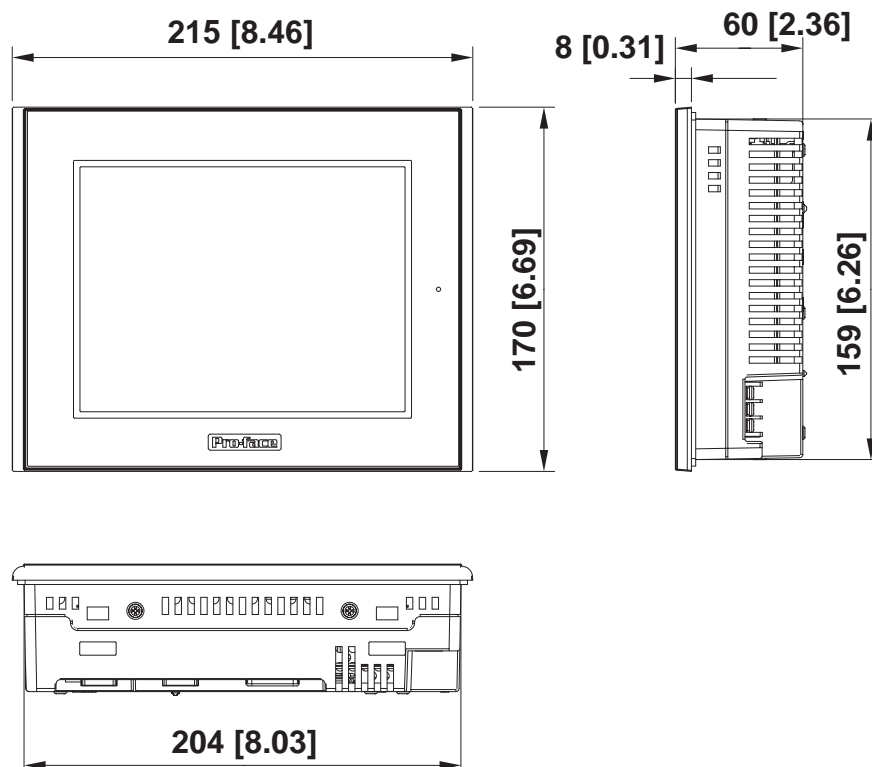
# 1 Part Names



- A : Display
- B : Touch Panel
- C : Status LED
- D : Power Input Terminal Block
- E : Expansion Unit Interface 1 (EXT1)
- F : Expansion Unit Interface 2 (EXT2)
- G : CF Card Cover
- H : CF Card Slot
- I : RAS Interface (RAS)
- J : Serial Interface (COM 1)
- K : Serial Interface (COM 2)
- L : Printer interface (PIO)
- M : Ethernet Interface (10BASE-T)
- N : Sound Output Terminal Block
- O : USB interface

# 2 Dimensions

Unit:mm [in.]



# 3 General Specifications

## ■ Electrical

Input Voltage	DC24V
Rated Voltage	DC19.2V to DC28.8V
Allowable Voltage Drop	10ms or less
In-Rush Current	30A or less
Power Consumption	28W or less
Voltage Endurance	AC1000V 20mA for 1 minute (between charging and FG terminals)
Isolation Resistance	Above 10MΩ at DC500V (between charging and FG terminals)



*Measure the PS-G unit's voltage level at the terminal block to confirm that it is within the range of 24V ±5%. If the voltage level is below this range, the PS-G unit's display may darken, and require more time to light when turned on. If it is above this range, the lifetime of the back light may be shortened.*

## ■ Environment

Ambient Operating Temperature (Cabinet Interior and Panel Face)	0 °C to 50 °C *1
Storage Temperature	-20 °C to + 60 °C
Ambient Humidity	10%RH to 90%RH (non-condensing, dry bulb temperature : 39°C or less)
Dust	Less than 0.1mg/m <sup>3</sup> (Non-conductive particles)
Atmosphere	Free of corrosive gases
Air-pressure Resistance (Operating Altitude)	800 hPa to 1114 hPa (2000 meters or lower)
Vibration Resistance	IEC61131-2 (JIS B 3501) compliant When vibration is NOT continuous 10Hz to 57Hz 0.075 mm, 57Hz to 150Hz 9.8m/s <sup>2</sup> When vibration is continuous 10Hz to 57Hz 0.035 mm, 57Hz to 150Hz 4.9m/s <sup>2</sup> X,Y,Z directions for 10 times (80min.)
Noise Immunity (via noise simulator)	Noise Voltage : 1500Vp-p Pulse Length : 1 microsecond Rise Time : 1 nanosecond
Electrostatic Discharge Immunity	Contact Discharge, 6kV (IEC61000-4-2 Level 3)

*\*1 If the PS-G's operating temperature exceeds 40 °C for an extended period of time, the display quality, i.e, contrast, etc., may degrade. If, however, the operating temperature is reduced to 40°C or less, the display quality will return to normal.*

## ■ Structural

<b>Grounding</b>	100Ω or less, or your country's applicable standard
<b>Ratings</b> *1	(Front face of installed unit) Equivalent to IP65f (JEM 1030) Design Type: Modular Installation method: panel mount
<b>Cooling Method</b>	Natural air circulation
<b>Weight</b>	Approx. 1.7kg (3.7lb)
<b>Dimensions</b>	W215 mm [8.46 in.] x H170 mm [6.69 in.] x D60 mm [2.36 in.]

\*1 *The front face of the PS-G unit, installed in a solid panel, has been tested using conditions equivalent to the standard shown in the specification. Even though the PS-G unit's level of resistance is equivalent to this standard, oils that should have no effect on the PS-G 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 PS-G's front face protection sheet becomes peeled off, these conditions can lead to the ingress of oil into the PS-G 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 PS-G be sure to confirm the type of conditions that will be present in the PS-G's operating environment.*

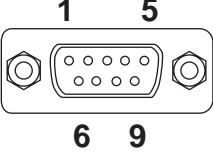
*If the installation gasket is used for a long period of time, or if the unit and its gasket are removed from the panel, the original level of the protection cannot be guaranteed. To maintain the original protection level, you need to replace the installation gasket regularly.*

# 4 Interfaces

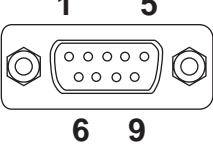
## ■ Serial Interface (COM 1,COM 2)

### RS-232C Interface

#### ◆COM1

Pin Arrangement	PIN#	Signal	Notes	Direction
	1	CD	Carrier Detect	Input
	2	RD (RXD)	Receive Data	Input
	3	SD (TXD)	Send Data	Output
	4	ER (DTR)	Data Terminal Ready	Output
	5	SG	Signal Ground	-
	6	DR (DSR)	Data Set Ready	Input
	7	RS (RTS)	Request Send	Output
	8	CS (CTS)	Clear Send	Input
	9	CI (RI)	Ringing Indicate	Input

#### ◆COM2

Pin Arrangement	PIN#	Signal	Notes	Direction
	1	NC	No Connection	-
	2	RD (RXD)	Receive Data	Input
	3	SD (TXD)	Send Data	Output
	4	NC	No Connection	-
	5	SG	Signal Ground	-
	6	NC	No Connection	-
	7	RS (RTS)	Request Send	Output
	8	CS (CTS)	Clear Send	Input
	9	VCC	+5V - Power Supply for External Devices	-

Recommended Connector : Dsub 9-pin socket XM2D-0901 <made by OMRON Corp.>

Recommended Cover : Dsub 9-pin Cover XM2S-0913 <made by OMRON Corp.>

Use Jack Screw XM2Z-0073 <made by OMRON Corp.> when needed.

Recommended Cable : CO-MA-VV-SB5P x 28AWG  
<made by HITACHI Cable Ltd.>



- The rated electric current of COM2's No.9 (DC5V) output is 0.20A MAX.
- Be sure to connect pin number 5 (SG) of COM1 and COM2 to the host unit's Signal Ground terminal.
- Connect the FG terminal line to the connector shell's PS-G connector fastening screw.
- FG and SG terminals are internally connected in the PS-G. When connecting to another device, be sure to create an SG shorting loop in your system.



Use inch type (#4-40UNC) threads to hold the cable's set (fastening) screws in place.



## ■ Printer Interface (PIO)

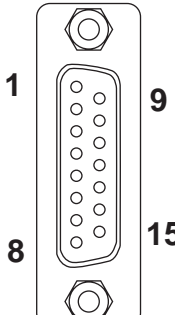
To connect a printer, use the Digital's printer cable, PSM-PRCB00.

Pin Arrangement	PIN#	Signal	Notes	Direction
	1	GND	Ground	-
	2	$\overline{\text{ACK}}$	Acknowledge	Input
	3	PDB5	Data Signal	Input/Output
	4	PDB4	Data Signal	Input/Output
	5	PDB3	Data Signal	Input/Output
	6	GND	Ground	-
	7	SLCT	Selected	Input
	8	PDB0	Data Signal	Input/Output
	9	$\overline{\text{PSTB}}$	Strobe Signal	Output
	10	BUSY	Busy Signal	Input
	11	PDB7	Data Signal	Input/Output
	12	PDB6	Data Signal	Input/Output
	13	GND	Ground	-
	14	$\overline{\text{ERROR}}$	Printer Error	Input
	15	GND	Ground	-
	16	PDB2	Data Signal	Input/Output
	17	PDB1	Data Signal	Input/Output
	18	PE	Out of Paper	Input
	19	$\overline{\text{INIT}}$	Initial Signal	Output
	20	GND	Ground	-

## ■ Sound Output Terminal Block

Pin Arrangement	Signal	Notes	Direction
	SP-OUT	Speaker Output Terminal	Output
	GND	Ground	-
	LINE-OUT	Line Out Output Terminal	Output

## ■ RAS Interface (RAS)

Pin Arrangement	Pin #	Signal	Notes
	1	ALARM-OUT (-)	Alarm Output (-)
	2	DOUT (-)	General Purpose Output (-)
	3	RESET-IN (-)	Remote Reset Input (-)
	4	DIN0 (-)	General Purpose Input 0 (-)* <sup>1</sup>
	5	DIN1 (-)	General Purpose Input 1 (-)* <sup>1</sup>
	6	NC	No Contact
	7	RESERVE	Reserved
	8	RESERVE	Reserved
	9	ALARM-OUT (+)	Alarm Output (+)
	10	DOUT (+)	General Purpose Output (+)
	11	RESET-IN (+)	Remote Reset Input (+)
	12	DIN0 (+)	General Purpose Input 0 (+)* <sup>1</sup>
	13	DIN1 (+)	General Purpose Input 1 (+)* <sup>1</sup>
	14	RESERVE	Reserved
	15	RESERVE	Reserved

\*1 General Purpose Input will latch Input Information. (This detects only the DIN circuit's ON state. OFF is not monitored.)

Recommended Connector : Dsub 15-pin plug XM2A-1501 <made by OMRON Corp.>

Recommended Cover : Dsub 15-pin Cover XM2S-1513 <made by OMRON Corp.>

Use Jack Screw XM2Z-0073 <made by OMRON Corp.>  
when needed.

## ■ Ethernet Interface (10BASE-T)

This interface complies with the IEEE802.3 standard for Ethernet (10BASE-T) interface connections. This interface uses an RJ-45 type modular jack connector (8 points).

## ■ CF Card Slot

This slot accepts a CF Card.

## ■ USB Interface

This interface is for connecting USB equipment.

## ■ Expansion Unit Interface 1 (EXT1)

This interface is used to connect a DIO unit.

## ■ Expansion Unit Interface 2 (EXT2)

This interface is a PCMCIA Bus Interface.

This is used to connect a PCMCIA unit.



**Note:** EXT1 and EXT2 cannot be used at the same time.

# 5 Installation

## ■ Confirm the Installation Gasket's Positioning

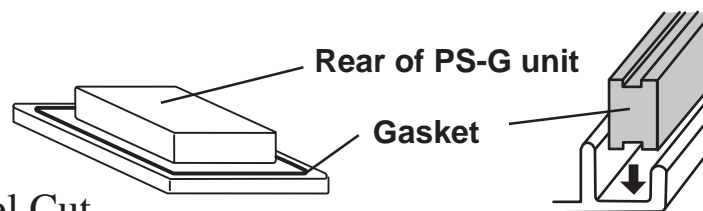
It is strongly recommended that you use the installation gasket.

Place the PS-G on a level surface with the display panel facing downward.

Check that the PS-G's installation gasket is seated securely into the gasket's groove, which runs around the perimeter of the panel's frame.



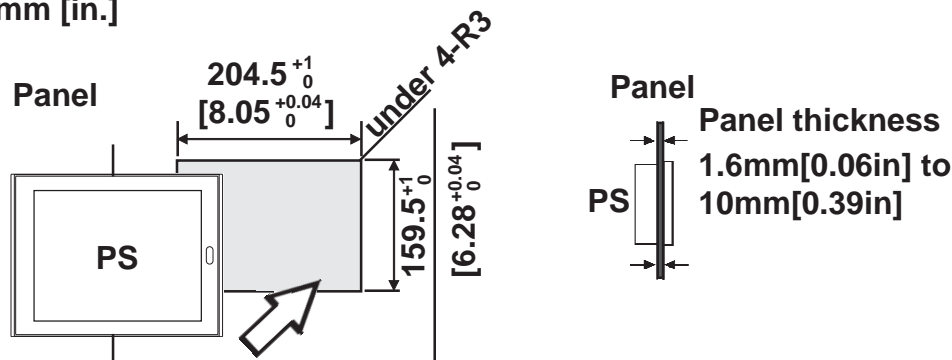
- Before installing the PS-G into a cabinet or panel, check that the installation gasket is securely attached to the unit.
- A gasket which has been used for a long period of time may have scratches or dirt on it, and could have lost much of its water resistance. Be sure to change the gasket at least once a year, or when scratches or dirt become visible.
- Be sure to use gasket model PS400-WP00-MS.
- 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.



## ■ Create a Panel Cut

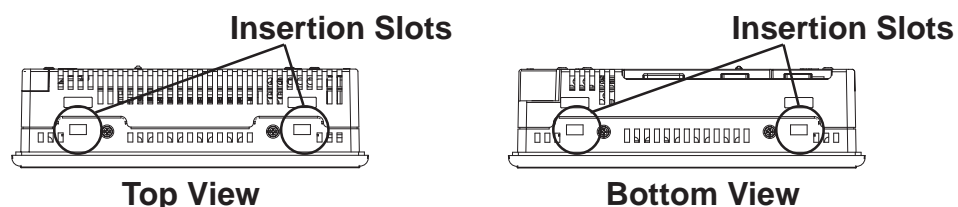
Insert the PS-G into the panel from the front

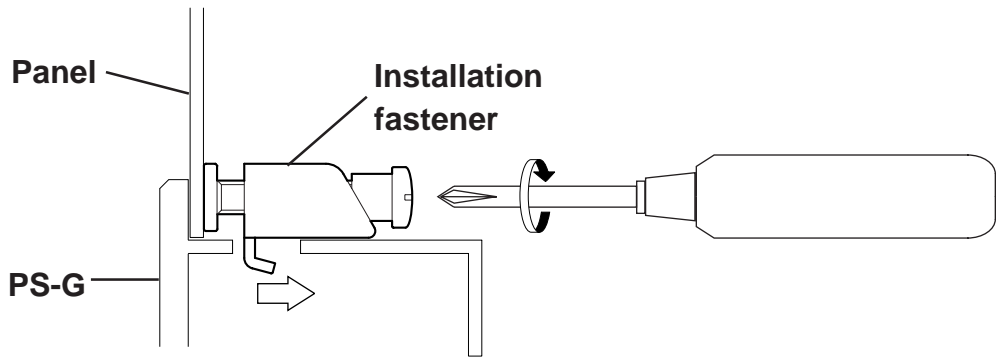
Unit: mm [in.]



## ■ Attach the Installation Fasteners from Inside the Panel

The following figures show the four (4) insertion slot locations of the PS-G installation fasteners. Insert the hook section into the slot and tighten the fastener with a screwdriver as shown below.





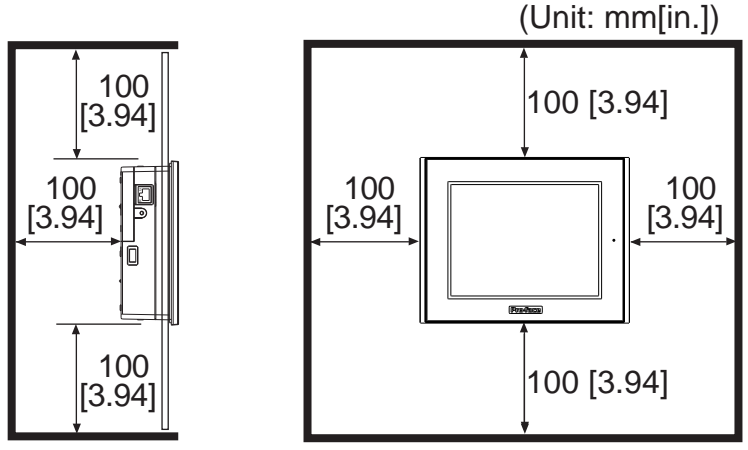
- *Tightening the screws with too much force can damage the PS-G unit's plastic case.*
- *The torque necessary is 0.5 N•m.*



- **Depending on the installation panel's thickness, etc., the number of installation fasteners used may need to be increased to provide the desired level of moisture resistance.**
- **Installation fasteners are sold by your local PS-G distributor.**
- **Be sure to use installation fastener model GP070-AT01.**

■ **Installation Requirements**

- To enhance the PS-G's maintainability, operability and ventilation, allow at least 100 mm clearance between the PS-G and other objects. (The clearance must be large enough to allow you to install or uninstall option units and to attach connectors.)



- Standard installation for the PS-G unit is in a vertical panel. If the PS-G unit is to be installed in a slanted panel, the panel should not incline more than 30° from the vertical.
- If the PS-G panel is to be installed in a slanted panel that inclines more than 30°, use forced-air cooling to ensure the ambient operation temperature does not exceed 50° C.
- Horizontal installation (that is, rotating the panel so that one of its sides is the base) is not supported.

## 6 Wiring

### WARNINGS

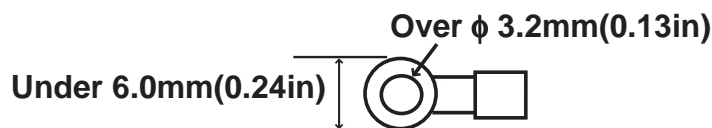
- To prevent an electric shock, check that the PS-G's power supply is completely turned OFF, via a breaker, or similar unit before connecting the PS-G's power cord terminals to the power terminal block.
- The PS-G can accept only DC24V input. If you use power other than DC24V, you can damage both the power supply and the PS-G unit.
- Since the PS-G unit has no power ON/OFF switch, be sure to attach a breaker type switch to its power cord.



When the FG terminal is connected, be sure the wire is grounded. Not grounding the PS-G unit will result in excess noise and vibration.

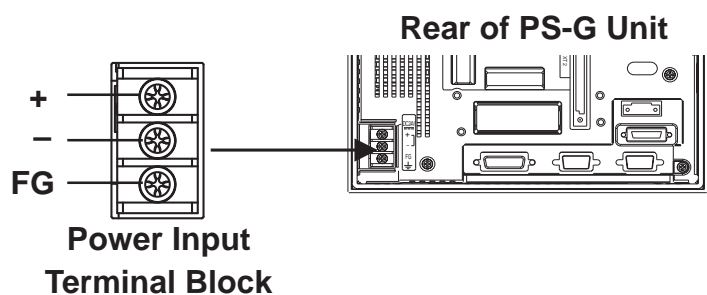
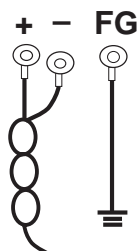


- Wherever possible, use thick wires (max. 2 mm<sup>2</sup>) for PS-G power cord power terminals. Also, to reduce noise be sure to twist the wire ends before attaching the connectors.
- Use the following sized Ring Terminals.



- To avoid a short caused by loose ring terminals, be sure to use ring terminals with an insulating sleeve.

Ring Terminals\*1



\*1 + : Positive electrode

- : Negative electrode

FG : Ground Terminal connected to the PS-G chassis

Suggested Ring Terminal : V2-MS3 (made by JST)

## ■ Connecting the PS-G's Power Cord Terminals

When connecting the power cord, be sure to follow the procedures given below.

1. Confirm that the main power is OFF.
2. Remove the terminal block cover's attachment screws.
3. Remove the terminal block cover.
4. Remove the screws from the three (3) middle terminals.
5. Align the power wires (braided) and the grounding (FG) wire as shown above.
6. Reinsert and tighten the terminal screws.  
(Torque should be 0.5 to 0.6 N•m)
7. Reattach the terminal block cover and tighten its screws.  
(Torque should be 0.5 to 0.6 N•m)

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## 7 Power Supply Cautions

Please pay special attention to the following instructions when connecting the power cord terminals to the PS-G unit.

- If the power supply voltage exceeds the PS-G unit's range, connect a voltage transformer.
- Between the line and the ground, be sure to use a low noise power supply. If there is still an excessive amount of noise, connect a noise reducing transformer.
- 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 before connecting it to the PS-G unit.
- The PS-G unit's power supply cord should not be bundled with or kept close to main circuit lines (high voltage, high current), or input/output signal lines.
- Connect a surge absorber to handle power surges.
- To reduce noise, make the power cord as short as possible.

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## 8 Grounding Cautions

- Use a grounding resistance of less than 100W or your country's applicable standard.
- The grounding for the PS-G unit should be independent of other devices. Use exclusive grounding or a common grounding point.
- Be sure to separate the grounding for the surge protector and for the PS-G unit.
- FG and SG terminals are internally connected in the PS-G. When connecting to another device, be sure to create an SG shorting loop in your system.

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## 9 Input/Output Signal Line Cautions

- Input and Output signal lines must be separated from the power control cables for operational circuits.
- If this is not possible, use a shielded cable and the shield should be grounded.

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## 10 Replacing the Backlight

- The PS-G unit's backlight is user replaceable.

For an explanation of how to replace the PS-G unit's backlight, please refer to the instruction manual which comes with the replacement backlights (sold separately).

- Be sure to use backlight model PS400-BU00-MS.



*Using an incorrect backlight may cause an accident or malfunction.*

### Note

Be aware that the Digital Electronics Corporation shall not be held liable for any real or estimated damages or losses, or third party claims resulting from the use of this product.

# *Memo*