

SP5000 Series (Box Module)
Installation Guide

SP5000 シリーズ (ボックスモジュール)
取扱説明書



Please read the “Warning/Caution Information” on the attached sheet before using the product.

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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 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 to 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 its installation, and has received safety training to recognize and avoid the hazards involved.

Model Numbers

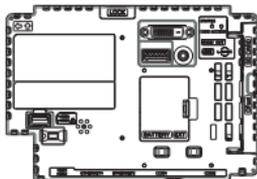
Series		Model Name	Model Number
SP5000 Series	Power Box	SP-5B10	PFXSP5B10
	Open Box	SP-5B40	PFXSP5B40

NOTE : These models can be connected to all models of SP5000 Series Display Module. For the model numbers of the Display Module, refer to Model Names in the SP5000 Series (Display Module) Installation Guide.

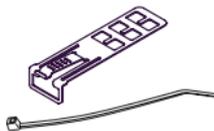
Package Contents

The following items are included in the package. Before using this product, please confirm that all items listed here are present:

1



2



- 1 SP5000 Series Box Module: 1
- 2 USB Clamp Type A (1 port): 2 sets for Power Box, 3 sets for Open Box (1 clip and 1 tie)
- 3 SP5000 Series (Box Module) Installation Guide (this guide): 1
- 4 Warning/Caution Information: 1
- 5 End-user License Agreement (only for Open Box): 2

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

About the Manual

This manual describes wiring and installation procedures. For more detailed information, refer to the SP5000 Series Hardware Manual.

You can download the manual from our website "Otasuke Pro!" at:
<http://www.pro-face.com/otasuke>

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>

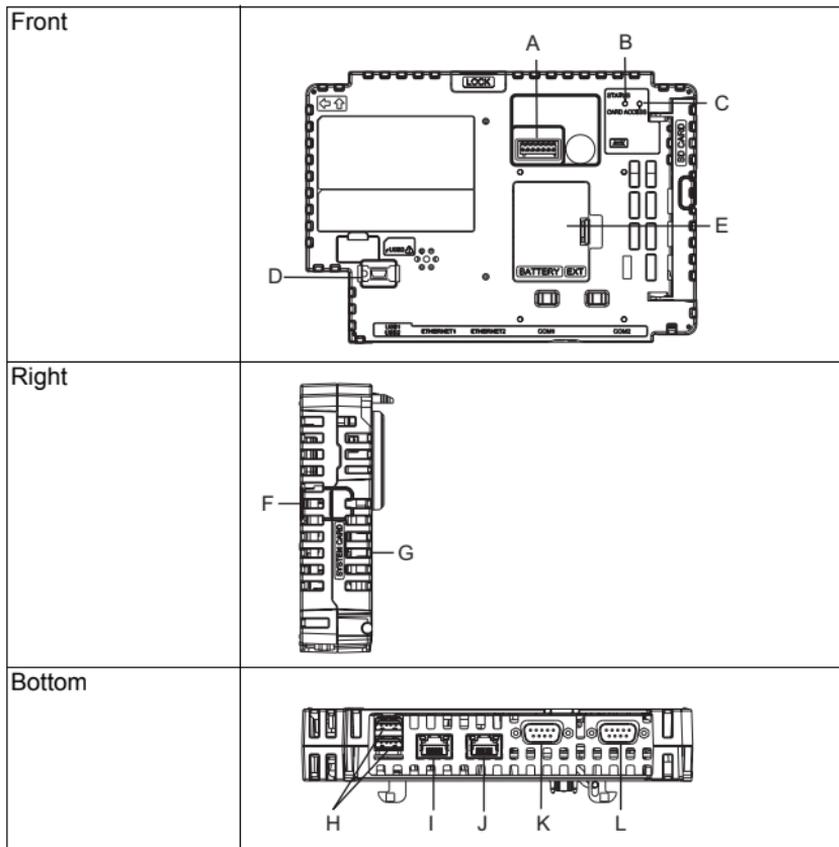
Language Settings (Only for Open Box)

The factory setting of the operating system language is English. Change the operating system language as required.

For details on changing the operating system language, refer to the following URL.

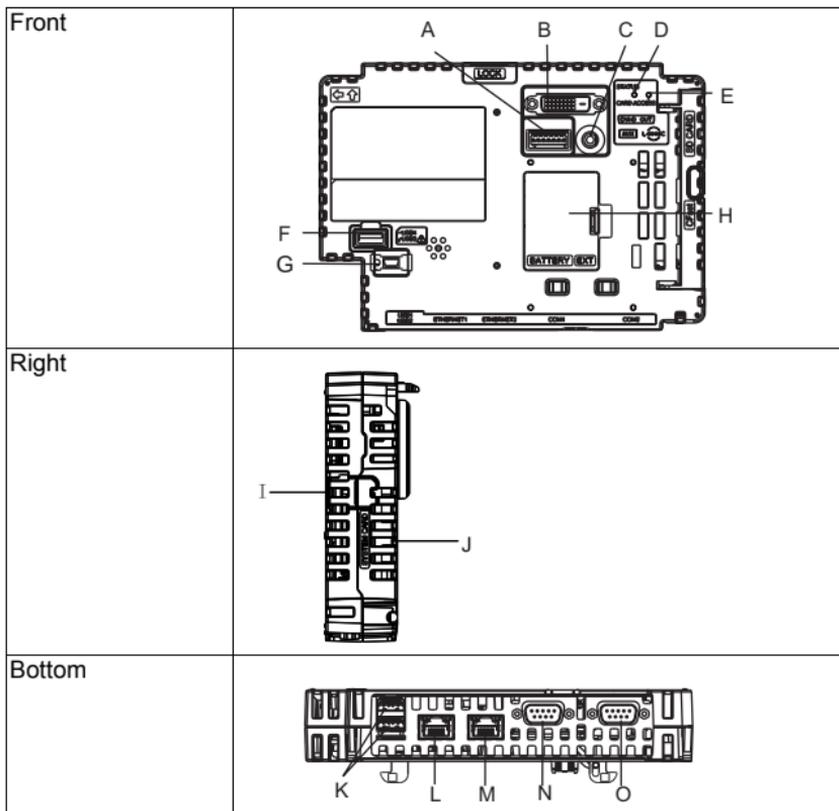
<http://www.pro-face.com/trans/en/product/1017.html>

SP-5B10



- A: Auxiliary Output/Speaker Output Interface (AUX)
- B: Status LED (See page 11)
- C: Card Access LED (See page 11)
- D: USB (mini-B) Interface
- E: Expansion Unit Interface Cover (EXT)
- F: Storage Card Cover
- G: System Card Cover
- H: USB (Type A) Interface
- I: Ethernet Interface (Ethernet1)
- J: Ethernet Interface (Ethernet2)
- K: Serial Interface (COM1)
- L: Serial Interface (COM2)

SP-5B40



- A: Auxiliary Output/Speaker Output Interface (AUX)
 B: DVI-D Output Interface
 C: AUDIO Input Interface (L-IN/MIC)
 D: Status LED (See page 11)
 E: Card Access LED (See page 11)
 F: USB (Type A) Interface
 G: USB (mini-B) Interface
 H: Expansion Unit Interface Cover (EXT)
 I: Storage Card Cover
 J: System Card Cover
 K: USB (Type A) Interface
 L: Ethernet Interface (Ethernet1)
 M: Ethernet Interface (Ethernet2)
 N: Serial Interface (COM1)
 O: Serial Interface (COM2)

LED Indications

Status LED

Color	Indicator	SP-5B10		SP-5B40	
		HMI Operation	Logic Program Operation*1	HMI Operation	Logic Program Operation*1
Green	ON	Offline	–	Offline	–
		In operation	RUN	In operation	RUN
	Flashing	In operation	STOP	In operation	STOP
Orange	Flashing	Software starting up.			
Red	ON	Power is turned ON.			
	Flashing	In operation	Major error	In operation	Major error
Red/Green	Alternating	Display Module connection error.			
Orange/ Red	Alternating	SD Card boot error		–	
–	OFF	Power is turned OFF.			

*1 Only when your screen editing software supports the Logic Program.

NOTE : When the SP-5B40 is connected and the power cable is connected to the power supply, even if the system is stopped the Display Module's Status LED will display red.

Card Access LED

Color	Indicator	SP-5B10	SP-5B40
Green	ON	Storage Card is being accessed.	Storage Card or System Card (OS) is being accessed.
-	OFF	Storage Card is not inserted or accessed.	Storage Card or System Card (OS) is not accessed.

Electrical Specifications

Specification		SP-5B10	SP-5B40	
Power Supply	Rated Input Voltage	12 Vdc (Supply from Display Module)		
	Power Consumption (Primary Power Supply [including power loss])	Max	25 W	35 W
		When power is not supplied to external devices	12.5 W or less	22.5 W or less

Environmental Specifications

Physical Environment	Surrounding Air Temperature	0...60 °C (32...140 °F)
	Storage Temperature	-20...60 °C (-4...140 °F)
	Surrounding Air and Storage Humidity	10...90% RH (non-condensing, wet bulb temperature 39 °C [102.2 °F] or less)
	Dust	0.1 mg/m ³ (10 ⁻⁷ oz/ft ³) or less (non-conductive levels)
	Pollution Degree	For use in Pollution Degree 2 environment

Interface Caution

DANGER

ELECTRIC SHOCK AND FIRE

When using the SG terminal to connect an external device to this product:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the SG terminal to remote equipment when the external device is not isolated. Connect the SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

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

Serial Interface

For information on how to connect controllers and other types of equipment, refer to the corresponding device driver manual of your screen editing software.

The serial interface is not isolated. The SG (signal ground) and the FG (functional ground) terminals are connected inside this product. When the serial interface connector is D-Sub, connect the FG wire to the shell.

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 wall or cabinet.

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

NOTE : Use within the rated current.

Connection for Serial Interface

The Pin configuration of each serial interface is explained on the respective reference page.

	COM1	COM2
SP-5B10/ 5B40	RS-232C or RS-422/RS-485 (see page 15, 16)	RS-232C or RS-422/RS-485 (see page 15, 16)

The communication method can be switched via your screen editing software. The initial setting is RS-422/RS-485.

RS-232C

D-Sub 9 pin plug connector.

The communication method can be switched between RS-232C and RS-422/RS-485 via your screen editing software.

Pin Number	RS-232C		
	Signal Name	Direction	Meaning
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)/VCC	Input/–	Called Status Display +5V±5% Output 0.25 A ^{*1*2}
Shell	FG	–	Functional Ground (Common with SG)

*1 You can switch pin #9 between RI and VCC via your screen editing software. The VCC output is not protected against overcurrent. To prevent damage or malfunction, use within the rated current only.

*2 When using Open Box, use external equipment so that the sum of COM1 VCC output and COM2 VCC output totals 0.25 A.

Interfit bracket is #4-40 (UNC).

Recommendations:

- Cable Connector: XM3D-0921 manufactured by OMRON Corporation.
- Cable Cover: XM2S-0913 manufactured by OMRON Corporation.
- Jack Screw (#4-40 UNC): XM2Z-0073 manufactured by OMRON Corporation.

RS-422/485

D-Sub 9 pin plug connector.

The communication method can be switched between RS-232C and RS-422/RS-485 via your screen editing software.

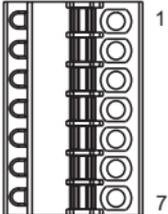
Pin Number	RS-422/RS-485		
	Signal Name	Direction	Meaning
1	RDA	Input	Receive Data A (+)
2	RDB	Input	Receive Data B (-)
3	SDA	Output	Send Data A (+)
4	ERA	Output	Data Terminal Ready A (+)
5	SG	-	Signal Ground
6	CSB	Input	Send Possible B (-)
7	SDB	Output	Send Data B (-)
8	CSA	Input	Send Possible A (+)
9	ERB	Output	Data Terminal Ready B (-)
Shell	FG	-	Functional Ground (Common with SG)

Interfit bracket is #4-40 (UNC).

Recommendations:

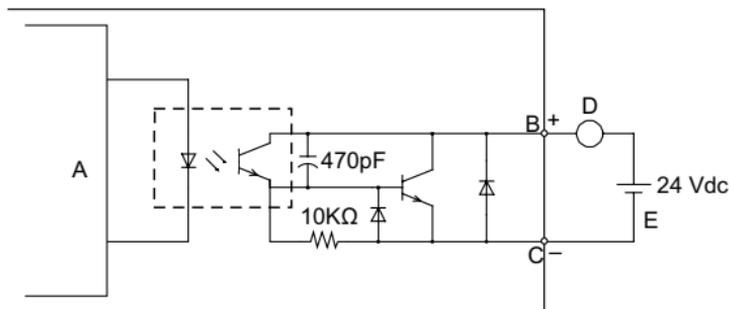
- Cable Connector: XM3D-0921 manufactured by OMRON Corporation.
- Cable Cover: XM2S-0913 manufactured by OMRON Corporation.
- Jack Screw (#4-40 UNC): XM2Z-0073 manufactured by OMRON Corporation.

Auxiliary Output/Speaker Output Interface (AUX)

Cable connection side	Pin Number	Signal Name	Direction	Meaning
	1	LineOut	Output	Line Out
	2	LineOut_GND	Output	Line Out Ground
	3	SP+	Output	Speaker +
	4	SP-	Output	Speaker -
	5	NC	-	No connection
	6	ALARM+/ BUZZER+	Output	(Can be changed via your screen editing software)
	7	ALARM-/ BUZZER-	Output	

AUX Connector: PFXZCDCNAUX1 manufactured by Pro-face.

Output Circuit



- A Internal Circuit
- B Pin Number 6: ALARM+/BUZZER+
- C Pin Number 7: ALARM-/BUZZER-
- D Load
- E External Power

DVI-D Output Interface (for SP-5B40)

DVI-D 24 pin socket connector

Product Side	Pin Number	Signal Name	Direction
	1	TMDS DATA 2-	Output
	2	TMDS DATA 2+	Output
	3	TMDS DATA 2 SHIELD	-
	4	NC	-
	5	NC	-
	6	DDC Clock	Output
	7	DDC Data	Input/Output
	8	NC	-
	9	TMDS DATA 1-	Output
	10	TMDS DATA 1+	Output
	11	TMDS DATA 1 SHIELD	-
	12	NC	-
	13	NC	-
	14	+5V Power	-
	15	GND	Ground
	16	NC	-
	17	TMDS DATA 0-	Output
	18	TMDS DATA 0+	Output
	19	TMDS DATA 0 SHIELD	-
	20	NC	-
	21	NC	-
	22	TMDS CLOCK SHIELD	-
	23	TMDS CLOCK+	Output
	24	TMDS CLOCK -	Output
Shell	FG	Functional Ground	

Recommendations:

DVI-D cable manufactured by Pro-face (FP-DV01-50 [5 m])

NOTE :

- For noise-free operation, use the recommended DVI-D cable.
- DVI-D output does not support Hot Plug Detect (HPD). Even when the main unit power is on while connected to an external display, this product outputs the display signal as XGA. If the external display does not support XGA input, the screen will not display.

Installation Procedure

Installing onto Display Module

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Display Module and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the Display Module.

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

NOTICE

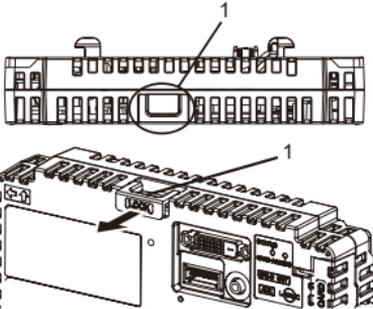
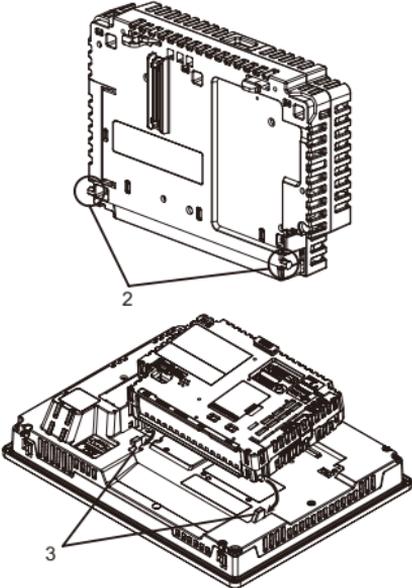
EQUIPMENT DAMAGE

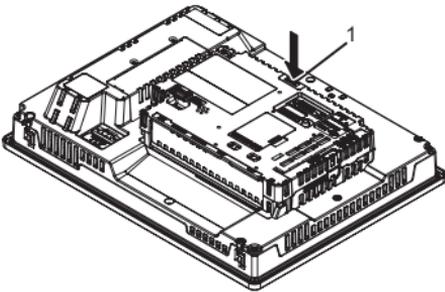
- When mounting this product vertically, first install the Box Module onto the Display Module before attaching the Display Module to the panel. When installing the Box Module onto the Display Module, place the Display Module on a clean and level surface with the screen facing downward.
- Only qualified personnel can change the primary battery.

Failure to follow the instruction can result in equipment damage.

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

- This product is not approved as an enclosure. When building this product into an end-use product, be sure to use an enclosure that satisfies standards as the end-use product's overall enclosure.
- This product must be used indoors only.

Step	Action
1	<p data-bbox="215 155 918 208">Pull the LOCK forward on the top of the Box Module to release the lock as illustrated.</p>  <p data-bbox="215 543 304 569">1 LOCK</p>
2	<p data-bbox="215 579 918 663">Insert the protruding points on the bottom left and right of the Box Module into the two holes on the back of the Display Module to attach the Box Module and Display Module together.</p>  <p data-bbox="215 1284 433 1336">2 Protruding points 3 Holes for insertion</p>

Step	Action
3	Fully push on the LOCK on the top of the Box Module to mount the Box Module on the Display Module.  1 LOCK

NOTE : Refer to the SP5000 Series Hardware Manual or the SP5000 Series (Display Module) Installation Guide on how to mount the Display Module to the panel.

Removal Procedure

Removing from Display Module

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Display Module and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the Display Module.

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

NOTICE

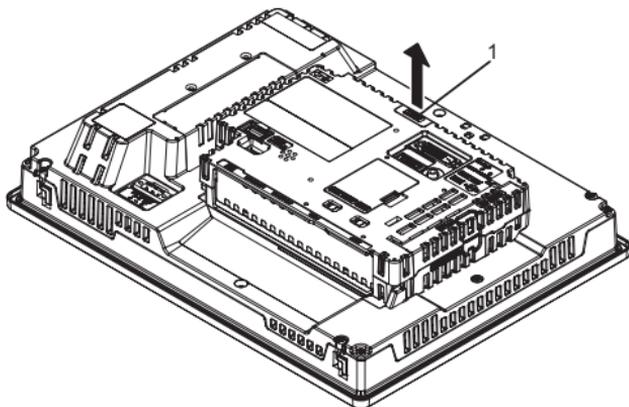
EQUIPMENT DAMAGE

When this product is mounted vertically, first remove the Display Module from the panel, then remove the Box Module from the Display Module.

Failure to follow the instruction can result in equipment damage.

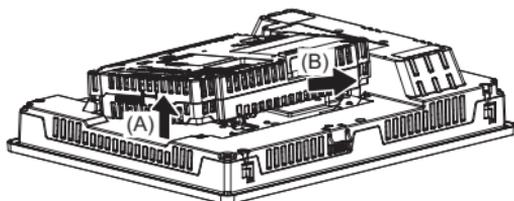
Step	Action
1	<p>When mounting this product vertically, remove the Display Module from the panel and place the Display Module on a clean and level surface with the screen facing down.</p> <p>NOTE : Refer to the SP5000 Series Hardware Manual or the SP5000 Series (Display Module) Installation Guide on how to remove the Display Module from the panel.</p>

- 2 Release the LOCK on the top of the Box Module as illustrated.



1 LOCK

- 3 Lift up the Box Module in the direction indicated by arrow (A) in the diagram and remove it by sliding in the direction indicated by arrow (B).



▲ CAUTION

RISK OF INJURY

Do not drop the Box Module when you remove it from the Display Module.

- Hold the unit in place after removing the fasteners.
- Use both hands.

Failure to follow the instruction can result in injury or equipment damage.

USB Cable Clamp

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

DANGER

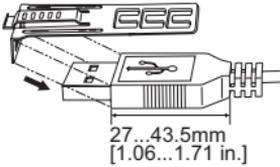
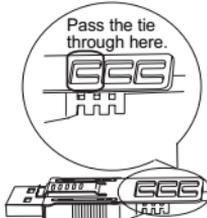
POTENTIAL FOR EXPLOSION

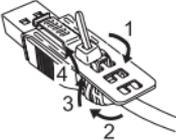
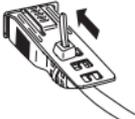
- Verify that the power, input and output (I/O) wiring are in accordance with Class I, Division 2 wiring methods.
- Substitution of any component may impair suitability for Class I, Division 2.
- Do not disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations.
- Remove power before attaching or detaching any connectors to or from this product.
- Ensure that power, communication, and accessory connections do not place excessive stress on the ports. Consider the vibration in the environment when making this determination.
- Securely attach power, communication, and external accessory cables to the panel or cabinet.
- Use only commercially available USB cables.
- Use only non-incendive USB configurations.
- Suitable for use in Class I, Division 2, Groups A, B, C, D Hazardous Locations.
- Confirm that the USB cable has been attached with the USB cable clamp before using the USB interface.

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

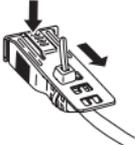
Attaching USB Clamp Type A (1 port)

NOTE : Watch your fingers. The edge of the clip is sharp.

Step	Action
1	<p>Mount the clip to the USB mark  connector shell so that it overlaps. The clip matches the 27 to 43.5 mm [1.06 to 1.71 inch] length of the USB connector.</p>  <p>NOTE : When installing clamps to reduce cable stress onto both USB1 and USB2, at USB1 overlay the clip on the side with the USB mark, and on USB2 the side without the USB mark. Make sure the ties do not interfere with the other.</p>
2	<p>Align the clip and the USB cable connector shell. Adjust the position of the holes where the clip is attached. To ensure stability, select the clip-hole position that is closest to the base of the connector shell.</p> 

3	<p>As shown, pass the tie through the clip hole. Next, turn the tie and pass it through the head so that the USB cable can pass through the center of the tie loop. The clip is now attached to the USB cable.</p>  <p>NOTE :</p> <ul style="list-style-type: none"> • Check the direction of the head beforehand. Make sure the USB cable is through the center of the tie loop and that the tie can pass through the head. • You can substitute the tie provided with PFXZCBCLUSA1 (manufactured by Pro-face) or other commercially available ties with a width of 4.8 mm [0.19 in.] and thickness of 1.3 mm [0.05 in.].
4	<p>While pressing the grip on the clip, insert the cable from step 3 all the way into the USB host interface. Make sure that the clip tab is secured to the USB cable attached to this product.</p> 

Removing USB Clamp Type A (1 port)

Step	Action
1	<p>Remove the USB cable while pushing the grip section of the clip.</p> 

AUX Connector

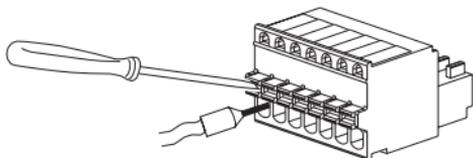
⚠ CAUTION

ELECTRIC SHOCK

- Remove the AUX connector from this product prior to wiring.
- Strip wires only to the required length.
- Do not solder the wire itself.

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

Step	Action
1	Insert the screwdriver into the opening button. This will open the wire's round-shaped hole.
2	Hold the screwdriver and insert the wire into the wire's round-shaped hole.
3	Take out the screwdriver from the opening button. The round-shaped hole will then close, and the wire will be held securely in place. To remove the wire, re-insert the screwdriver into the opening button and when the wire's spring clamp releases, pull the wire out.
4	Insert the wired AUX connector into the Auxiliary Output/Speaker Output Interface (AUX) of this product.



Recommendations:

- AUX Connector: PFXZCDCNAUX1 manufactured by Pro-face
- Screwdriver: SZS 0.4 X 2.0 (Product No. 1205202) manufactured by Phoenix Contact

If you use another manufacturer, be sure the part has the following dimensions:

- point depth: 0.4 mm [0.02 in.]
- point height: 2.0 mm [0.08 in.]

Point shape should have isolation properties meeting DIN 5264 and EN60900.

NOTE :

- Wire should be AWG 28 to AWG 20 thick and twisted.
- Applicable wire sizes are Style 1015 and Style 1007.
- Be sure to strip 8.0 mm (0.31 in.) of cover from the wire.

Standards

For information on certifications and standards, such as certified models and certificates, see the product markings or visit our website:
<http://www.pro-face.com/worldwide.html>

DANGER

POTENTIAL FOR EXPLOSION

- Suitable for use in Class I, Division 2, Groups A, B, C, and D Hazardous Locations.
- Substitution of any component may impair suitability for Class I, Division 2.
- Do not disconnect equipment while the circuit is live or unless the area is known to be free of ignitable gases concentrations.
- Always confirm that this product is suitable for use in hazardous locations by checking that the ANSI/ISA 12.12.01 or CSA C22.2 N°213 certification appears on the product labeling.
- Do not attempt to install, operate, modify, maintain, service, or otherwise alter this product except as permitted in this manual. Unpermitted actions may impair the suitability of this product for Class I, Division 2 operation.
- To power on or power off this product installed in a Class I, Division 2 hazardous location, you must either:
 - Use a switch located outside the hazardous environment, or
 - Use a switch certified for Class I, Division 1 operation inside the hazardous area.
- Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous. This applies to all connections including power, ground, serial, parallel, and network connections.
- Never use unshielded/ungrounded cables in hazardous locations.
- When enclosed, keep enclosure doors and openings closed at all times to avoid the accumulation of foreign matter inside the workstation.

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

Inquiry

Do you have any questions about difficulties with your unit?
Please access our site any time that you need help with a solution.
<http://www.pro-face.com/otasuke/>

Notes

Please be aware that Digital Electronics Corporation shall not be held liable by the user for any damages, losses, or third party claims arising from the uses of this product.

