

Interface Converter

PHC-D08

User's Manual

Model

PHC-D08

PHC-D08N



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Introduction

Thank you for purchasing the PATLITE “PHC-D08” (henceforth, written as “this product”) Interface Converter. Before installation and use, read this manual (henceforth, referred to as “this book”) and follow the cautions and guidelines presented. In addition, store this manual for future reference when performing maintenance, repairs or inspections. When performing maintenance and repairs, etc., be sure to reread this book.

After reading this book, if there are any questions concerning this product, feel free to contact your PATLITE Sales Representative indicated at the end of this book.

Notice

- ▶ The copyrights of this book is owned by the PATLITE Company, Inc. (henceforth referred to as “our company”). Any reproduction, duplication, alteration, or extracting portions of this book, etc., without written permission from our company is forbidden.
- ▶ Specifications, the design, and other contents written in this book may be changed for improvements without prior notice and may result in differences from the actual product purchased.
- ▶ This product meets severe quality control and inspection requirements prior to shipment, but if some failure or defect is found, please contact the place of purchase, or your PATLITE Sales Representative (indicated on the last page) to solve the issue.
- ▶ This product (software is included) is for the use of general office work, home and for personal use, it has been developed, designed and manufactured for general applications, such as for industry, and it is not designed for applications which demands high safety requirements, such as medical application equipment or systems used in connection directly, or indirectly, with human life. Please understand prior to use that no responsibility is taken at our company for damages or other disadvantages, due to customers using this product beyond the scope of its general application, or from any claims from third parties. When using this product for applications in which equipment of higher reliability than the general application demands, such as a computer system, etc., use suitable safety design countermeasures against system failure, etc.
- ▶ Please understand that our company does not take any responsibility for damage and other disadvantages this product (software is included) has caused due to the customer using this product, or any claims from third parties.
- ▶ This product (Body only) conforms to EN standards and shows the CE Markings.
- ▶ The AC Adaptor included does not conform to the EN standards, therefore does not show CE Markings.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Product Checklist

The following items are contained with this product.

- Main Unit (1 Body)
- Installation Manual (1 Sheet)
- Product Assurance Provisions (1 Sheet)
- Rubber Feet (4 Pieces)
- AC Adaptor (1 Unit- for PHC-D08 only)

For safe application, observe the following:

The following symbols classifies the following into different categories and explains the level of harm inflicted if the cautions are disregarded.

 Warning	Indicates an imminently dangerous condition: failure to follow the instructions may lead to death or serious injury.
 Caution	Indicates a potentially dangerous condition: failure to follow the instructions may lead to injury or damage to property.
 Prohibited	This symbol indicates "Prohibited", which should not be carried out by all means.
 Enforced	This symbol indicates "Enforced", which should be observed and carried out by all means.
 MEMO	Notice regarding supplementary information or convenient explanation is indicated.

Cautionary Notes

Prior to installation, read all notes and use this product correctly.

	 Warning
 Prohibited	- Do not disassemble or alter the product. Failure to comply may result in fire, electric shock, or failure. - Do not touch the electric socket with wet hands. Failure to comply will result in electric shock. - The power supply rating for the AC Adaptor is 100-240VAC. Do not allow the voltage to exceed the specified voltage tolerance. Failure to comply will result in internal circuitry damage or fire. - After mounting this product on the machine, do not remove the cover, or hook anything onto the product, or use the product as a step when climbing onto the machinery. Failure to comply may result in falling off the machinery, or product damage may occur. - Do not insert or pull out the DC plug while power for the AC Adaptor is on. It may cause electrical shock, failure, etc.
 Enforced	- When plugging the AC Adaptor into the power receptacle, be sure to check there is no dust accumulation on the plug, and insert into the power receptacle completely. By allowing dust to adhere to the AC Adaptor, it can be the result of fire or failure from short-circuiting. - Since dust can accumulate after a long time, and with moisture, can cause the dust to become conductive, in order to prevent the phenomenon of ignition from dust accumulation, it is best to periodically wipe the AC Adaptor and power receptacle with a damp cloth. By allowing dust to adhere to the AC Adaptor, it can be the result of fire or failure from short-circuiting. - Perform wiring work only after turning off power of the equipment to be connected and this product. There is a risk of internal circuit damage due to short-circuit or electrical shock. - When an unusual odor, sound or smoke comes out of the product, immediately disconnect the power, then contact your nearest PATLITE Sales Representative.
	 Caution
 Enforced	- Please place this product on a level surface, such as a desk etc. - When installing it in high places, such as on top of a shelf, use the rubber feet included on the bottom of the body to prevent it from sliding around and falling.
 Prohibited	- Do not expose it to high temperatures, such as near a fire and do not use it in humid places. Moreover, do not use this product in locations where corrosive or combustible gas is present. - If foreign substances, such as water, chemicals; or metals, such as copper, low carbon steel wire, fall into this product, do not use it. Possible cause of failure may occur. - Do not disassemble or attempt to repair this product by any means. Failure to comply will result in equipment damage or fire. - Do not bend the power supply cables or signal wires recklessly. Disconnection will result in this product breaking down. - Do not install or run wiring near, or where equipment (such as solenoids, etc.) generate strong electric or magnetic fields, or near any power lines. Failure to comply may result in malfunction due to inductive noise. - Do not place any part of this product (Body, AC Adaptor, Rubber Feet) where infants can reach it. If it is swallowed accidentally, it could be detrimental. If it is suspected of being swallowed, please consult an emergency medical center immediately.

1. Part Names and Dimensions

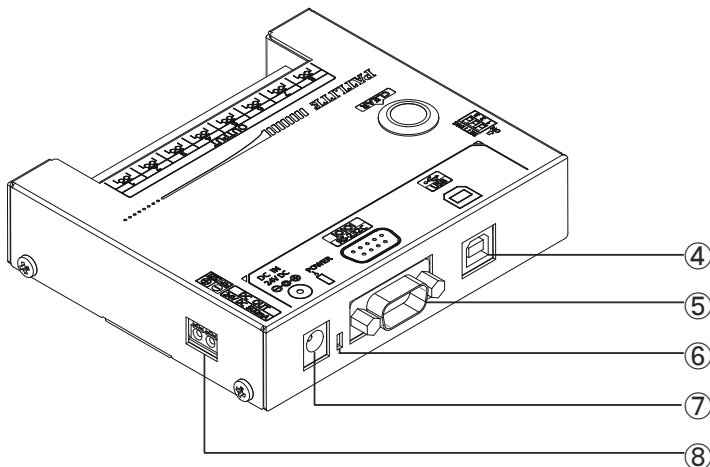
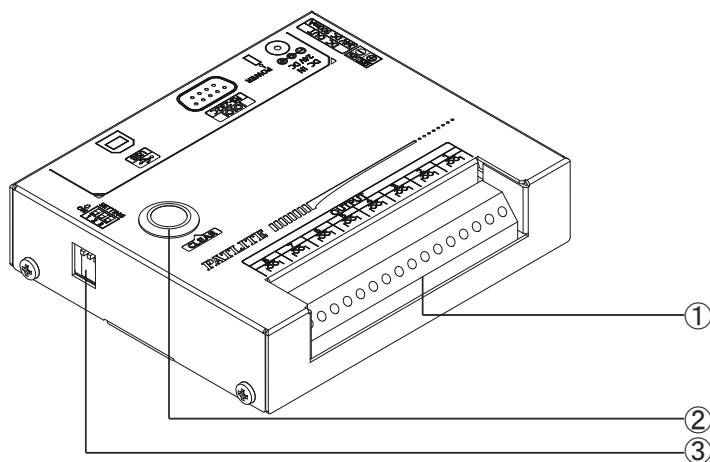
1.1. Model Number Configuration

PHC-D08

: AC Adaptor
 Blank: AC Adaptor included
 N: AC Adaptor not included

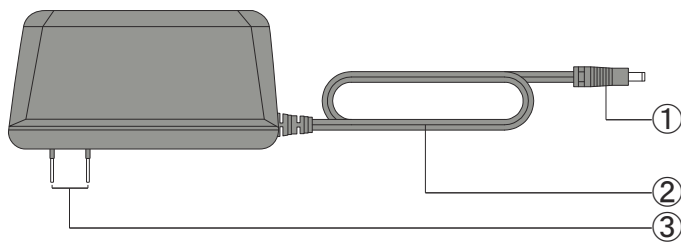
1.2. Part Names

1.2.1. Main Unit



Number	Name
1	Output Terminal Buss
2	"Clear" Switch
3	"Set" Switch
4	USB Port (Type-B)
5	RS-232C Port (D-sub 9 pin male)
6	Power Supply LED
7	DC Jack
8	Power Supply Output Terminal

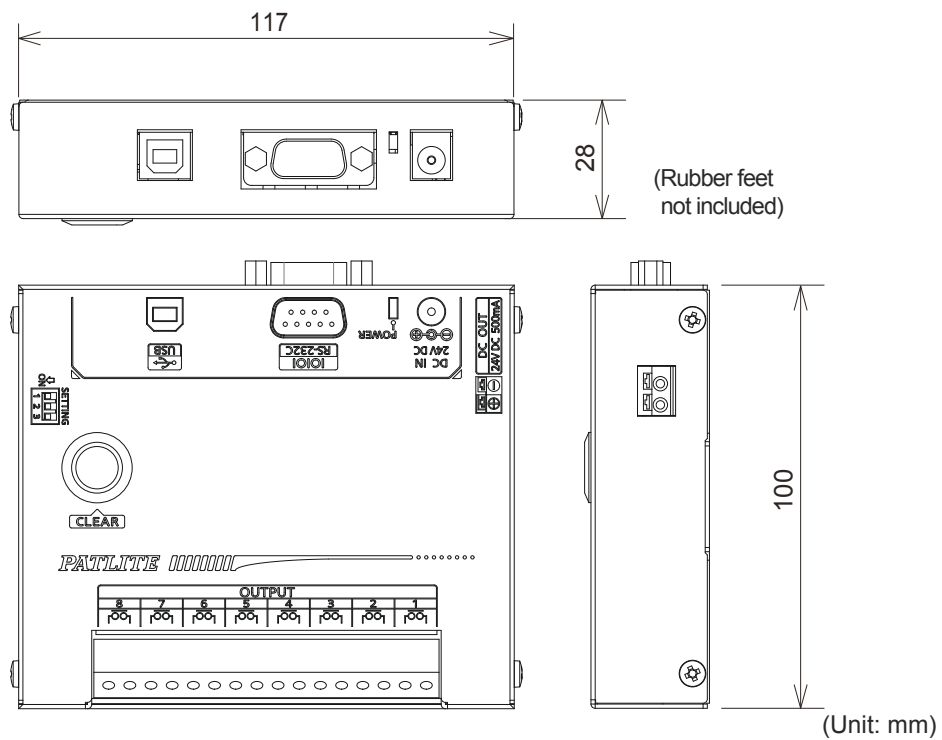
1.2.2. AC Adaptor



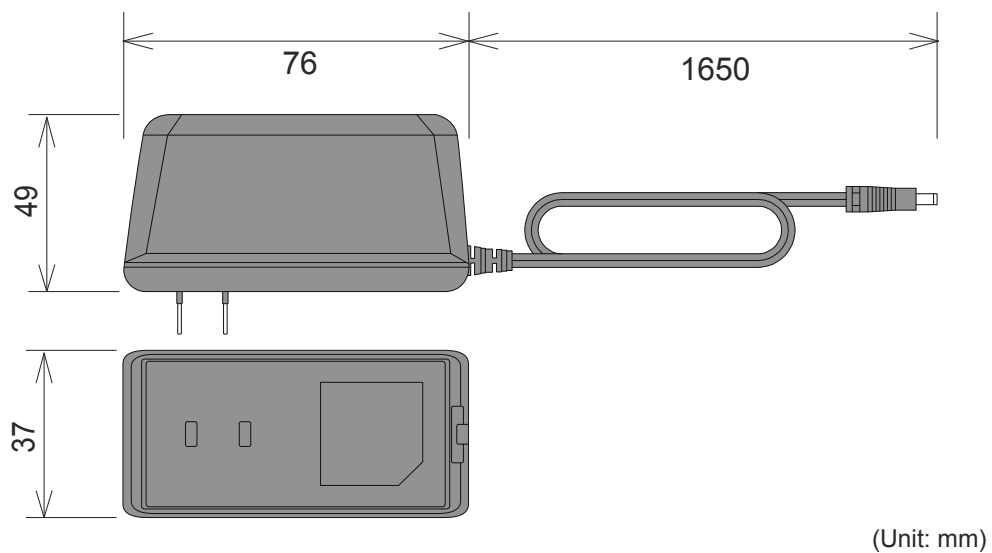
Number	Name
1	DC Plug
2	Power Supply Cable
3	Outlet Plug

1.3. Outer Dimensional Drawing

1.3.1. Main Unit



1.3.2. AC Adaptor



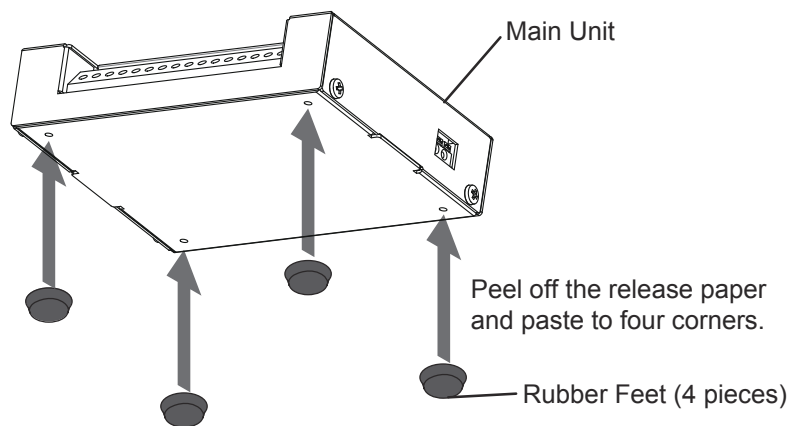
2. Product Installation

2

	⚠ Caution
⊘ Prohibited	• This product is designed for indoor use. Use this product in a location where it is not exposed to rain and water. Exposure to rain and water may result in failure and electric shock. • Install this product where the surface is stable and level. If this product is installed in an unstable location or on an incline, the product may fall, resulting in damage. • When installing this product, avoid installing it in the following places: ■ Where it's exposed to direct sunlight ■ Where high temperatures are present, such as near fire, or in a humid place ■ Where drastic temperature and humidity changes are present ■ Where it's exposed to an environment with poor ventilation ■ Where it's exposed to vibrations exceeding the specifications ■ Where it's exposed to corrosive gas ■ Where it's exposed to a salty air environment ■ Where it's exposed to dust, iron powder, etc. ■ Where it's exposed to high concentrations of chemicals or oil mist ■ Where it's exposed to rain, or other types of wet environments

2.1. Rubber Feet Installation

Prior to the installation of this product, locate a stable and level location, then attach the enclosed rubber feet (four pieces) to the bottom surface of this product.



2.2. Terminal Wiring

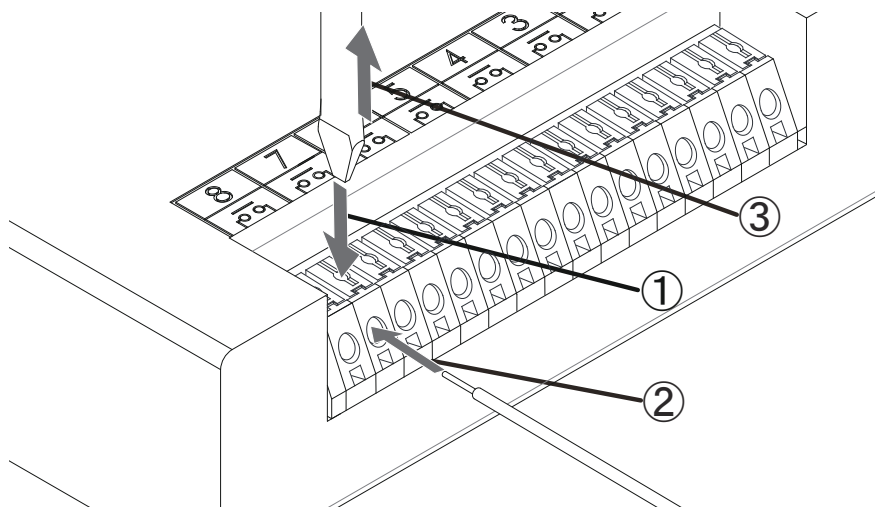
	⚠ Warning
! Enforced	- Perform wiring work only after turning off power of the equipment to be connected and this product. There is a risk of internal circuit damage due to short-circuit or electrical shock. - Screw-less terminal blocks are used in this product; be sure to use wires which characteristics such as wire type, wire diameter, and strip length are described in this manual. Failure to do so may cause contact failure, heat generation and loose wires, since the wire is not securely connected. - Be sure to insert the entire conductive part of the wire. If a stranded wire is sticking out from the wire inlet, or a bare wire touches the case, it may cause failure and possible fire to the main unit by short circuiting. - Pay attention to avoid wrong connections, a possibility of fire or damage may result.
	⚠ Caution
! Enforced	- Do not push the actuator part of the terminal block too hard. Doing so may result in the damage or failure of the terminal block and main unit. - After completing the wiring, make sure that there are no loose, disconnected or bare lead wires.

2.2.1. Output Terminal Wiring

Wire the output terminal according to the following steps.

[Wiring Method]

1. Use a minus driver to push in the tab of the control unit's terminal buss slot.
2. Insert a signal line lead wire into the slot. (Keep pushing the tab while inserting)
3. Release the minus driver to lock the lead wire in place.



Applicable Wires	Solid Wire: Diameter 0.4 mm to 1.2 mm (AWG26 to AWG18) Stranded Wire: Diameter 0.2 mm ² to 0.75 mm ² (AWG24 to AWG20) * Single wire diameter shall be 0.18 mm or more for stranded wire.
Wire Coating Strip Length	9mm
Suitable Actuator Tool	Width of flathead screwdriver bit: 1.5 to 2.5 mm Thickness of bit: 0.5 to 0.7 mm

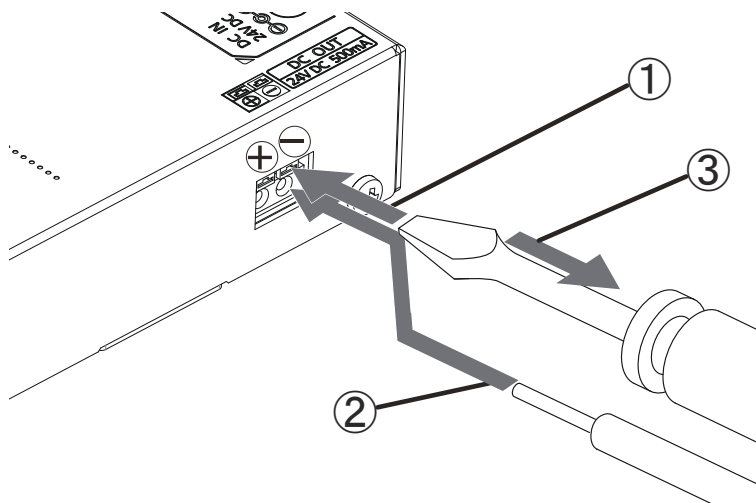
⚠ Caution	- Do not connect AC power to the Output Terminal Block. Failure to comply may result in a short-circuit and fire. - Use the Output Terminal Block within the contact's rated capacity. Failure to comply may result in malfunction and possible fire. - If the inrush load current exceeds the contact's rated capacity, scorching and welding of the contacts may occur. Therefore, do not apply such a load.		
<table> <tr> <td>Rated Contact Capacity</td><td>DC30V 3A</td></tr> </table>		Rated Contact Capacity	DC30V 3A
Rated Contact Capacity	DC30V 3A		

2.2.2. Power Supply Output Terminal Wiring

The Power Supply Output Terminal can be used to control an external load when an AC Adaptor is used. When using the Power Supply Output Terminal, wire in accordance to the directions indicated below.

[Wiring Method]

1. Use a minus driver to push in the tab of the control unit's terminal buss slot.
2. Insert a lead wire into the slot. (Keep pushing the tab while inserting)
3. Release the minus driver to lock the lead wire in place.



Applicable Wires	Single Wire: Diameter 0.4 mm to 1.2 mm (AWG26 to AWG18) Stranded Wire: Diameter 0.2 mm ² to 1.25 mm ² (AWG24 to AWG16) * Single wire diameter shall be 0.18 mm or more for stranded wire.
Wire Coating Strip Length	9mm
Suitable Actuator Tool	Width of flathead screwdriver bit: 1.5 to 2.5 mm Thickness of bit: 0.5 to 0.7 mm



Caution

- Do not connect any voltage to the Power Supply Output Terminal. Failure to comply will result in damage to the product and possible fire.
- Maintain the consumption current of the equipment linked to the Power Supply Output Terminal so as to not exceed the ratings indicated below. Do not connect any equipment which consumes more current than the rated capacity. Failure to comply may result in malfunction or damage.

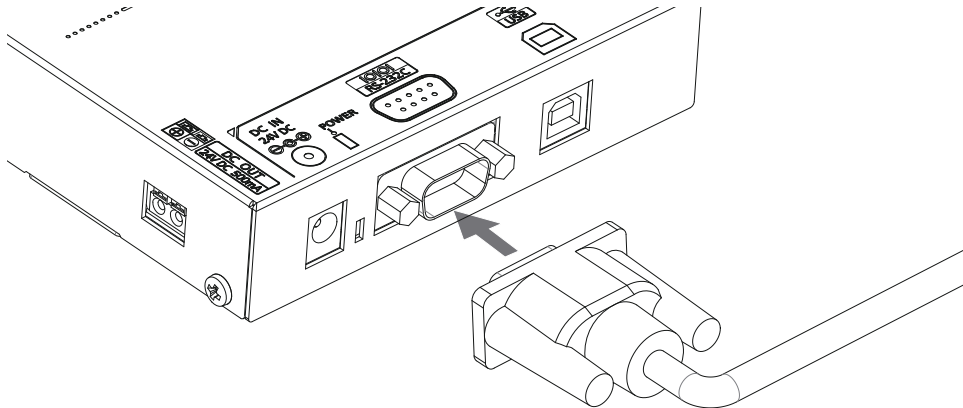
Power Output Voltage	DC24V
Power Output Current	500mA or less

MEMO

- The Power Supply Output Terminal cannot be used without an AC Adaptor used. Be sure to connect an AC Adaptor when using the Power Supply Output Terminal.

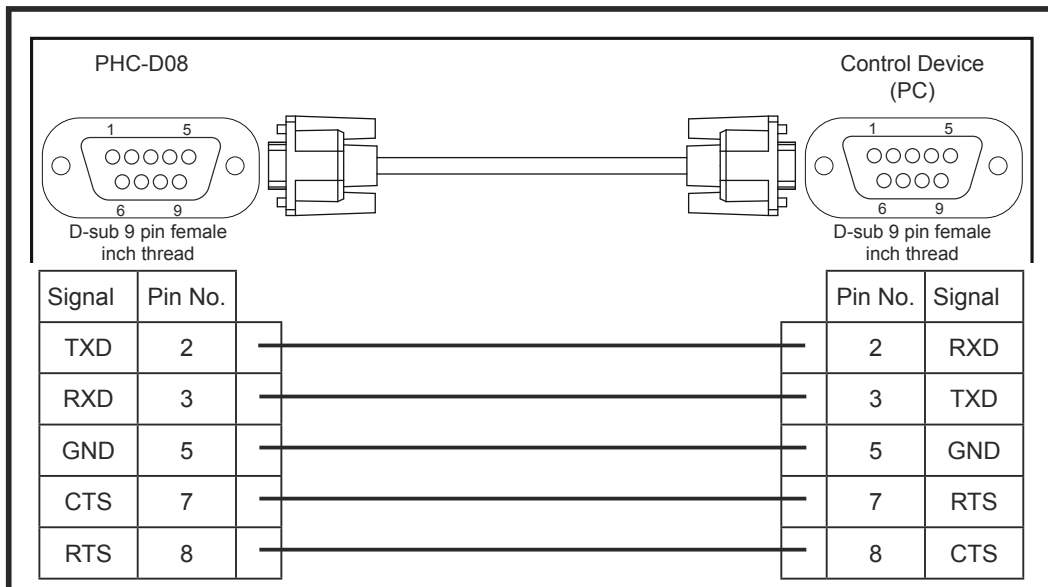
2.3. RS-232C Port Wiring

By connecting to the RS-232C (male) of this product and the RS-232C port of a PC with a D-sub 9 pin female-to-female type cable with straight wire connection, this product can be controlled via RS-232C transmission.



*The RS-232C cable is not included. Please purchase it separately.

Connect the cables with the connection pin numbers listed below. The pin numbers that are not shown will not affect the operation of this product.

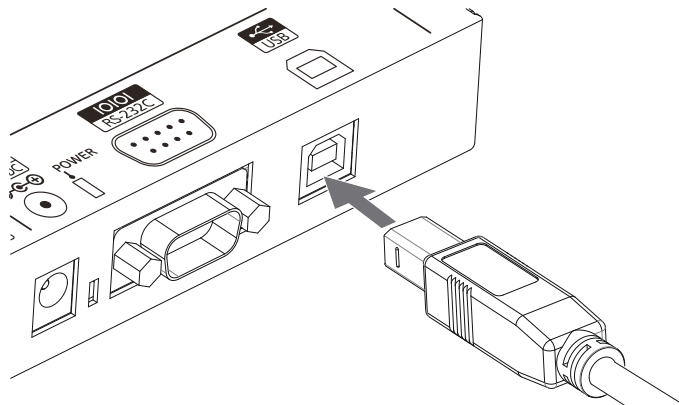


Caution

- Use a straight RS-232C cable when connecting to the connection devices (PC). This product may malfunction and cause failure to the Main Unit and other connected devices if they are used together with other devices.
- Do not bundle the RS-232C cable with power supply cords when being used. Failure to comply may result in malfunction from power line noise.
- Do not connect the RS-232C and USB cables simultaneously. Failure to comply may result in malfunction.
- Do not pull out or insert the RS-232C cable while the power supply is turned on.

2.4. USB Port Wiring

This product can be controlled via USB transmission by connecting a USB (Type B) cable from the main unit to the USB port of a PC. Since this product can operate on USB Bus Power, it can be used without an AC Adaptor. However, this product requires installation of a specialized driver for the PC before being connected to a PC via the USB. Go to our PATLITE homepage (<http://www.patlite.com>) to download the installer.



*The USB cable is not included. Please purchase it separately.

Caution

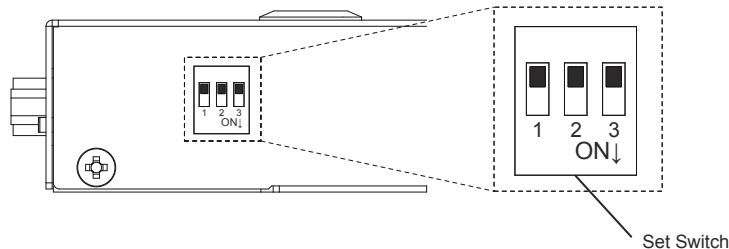
- Use a straight USB cable when connecting to the connection device's port (PC). This product may malfunction and cause failure to the Main Unit and other connected devices if they are used together with other devices.
- Do not bundle the USB cable with power supply cords when being used. Failure to comply may result in malfunction from induced noise.
- Do not connect the USB and RS-232C cables simultaneously. Failure to comply may result in malfunction.
- Do not insert or pull out the USB cable while the power supply is turned on.
- Depending on the feeding power capability of the Main Unit or the USB port of the personal computer, operation may become unstable. Use an AC Adaptor if this condition occurs.
- Use this product by connecting the USB cable directly, without the use of a USB hub. Failure to comply may cause unstable operation.
- It is recommended to use a USB cable with the length of 2m or less. Cables longer than 2m may cause unstable operation due to induced noise from the surrounding environment.

MEMO

- When installing exclusive drivers for compatible Operating Systems, etc., refer to the instructions attached to the drivers.

2.5. "Set" Switch

The operation mode of this product can be changed by changing the set switch located on the side of this product, before power activation.



The operation modes available are as follows:

Operation Mode	Set Switch			Function
	1	2	3	
Normal Operation	OFF	OFF	OFF	Operation by commands of "3.2. Frame Format"
Setup Test	OFF	ON	OFF	Operation by "4. Setup Test Mode"
Firmware Update	ON	OFF	OFF	Updating firmware of this product

MEMO

- For instructions on updating the firmware, download the instructions from Patlite's home page and check the manual.

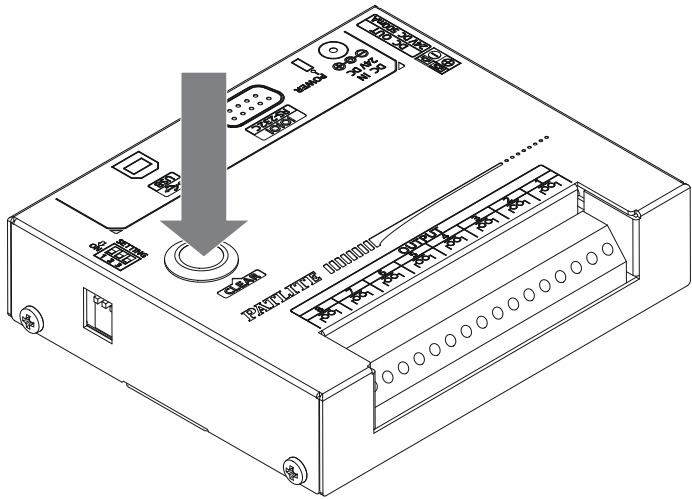


Caution

- When in the "Setup Test" and "Firmware Update" Modes, the commands for the "Normal Operation Mode" will not work. Therefore, put the "Set" Switches in the "Normal Operation Mode" and reactivate the power before sending commands.

2.6. "Clear" Switch

Pressing the "Clear" switch will turn off the output terminals.



2.7. Power Activation

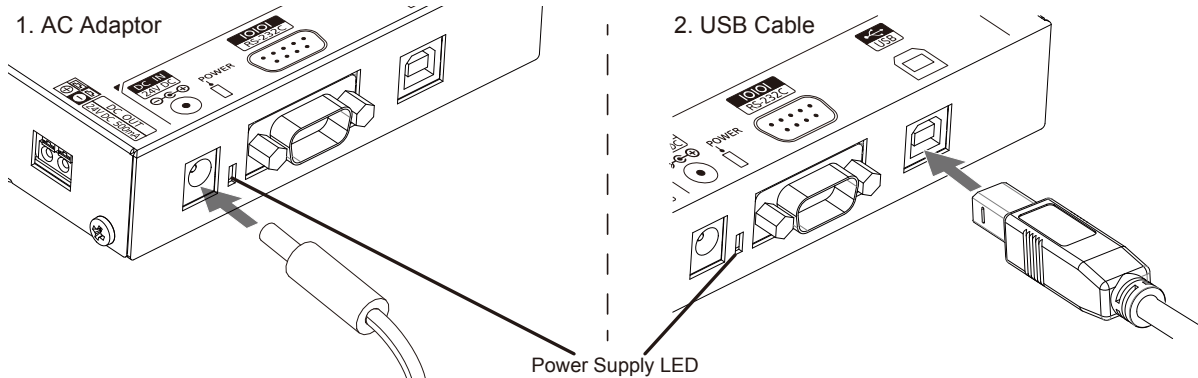
Two options for power activation are available for this product, using the AC Adaptor or USB Bus Power. Select among the power sources below that match your environment and turn on the power.

1. When using an AC Adaptor:

Insert DC plug into the main body of this product, and insert the AC adapter into an outlet. When power is switched on, the Power Supply LED will light up.

2. When using USB Bus Power

Insert the USB cable into the main body of this product and insert the top of the USB cable into the PC which has compatible bus power. When power is switched on, the Power Supply LED will light up.



 Warning

- Do not insert or pull out the DC Plug while power for the AC Adaptor is on. Failure to comply may result in electrical shock or product malfunction, etc.
- When plugging the AC Adaptor into the power receptacle, be sure to check there is no dust accumulation on the plug, and insert it into the power receptacle completely. By allowing dust to adhere to the AC Adaptor plug or Power Supply Terminal, it may result in fire or damage from short-circuiting.
- Do not touch the electric socket with wet hands. Failure to comply will result in electric shock.

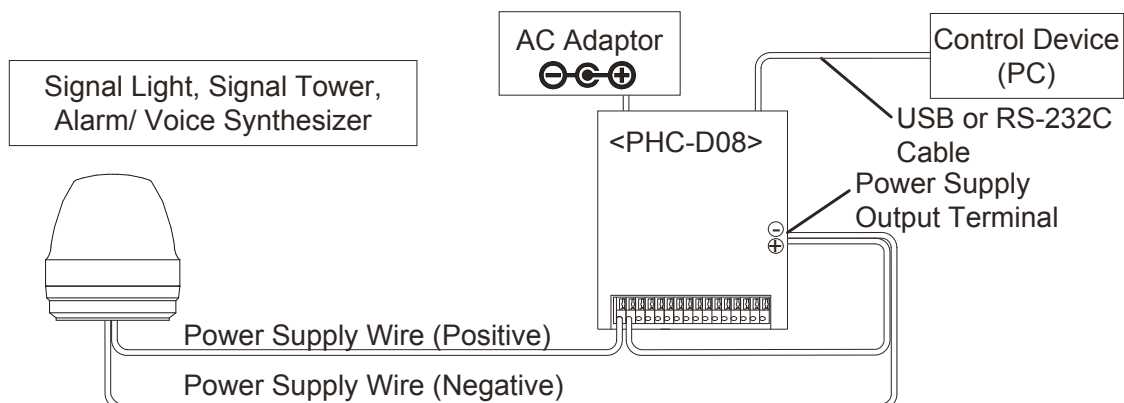
 Caution

- Depending on the feeding power capability of the Main Unit or the USB port of the personal computer, operation may become unstable. Use an AC Adaptor if this condition occurs.
- Use this product by connecting the USB cable directly, without the use of a USB hub. Failure to comply may cause unstable operation.
- The Power Supply Output Terminal cannot be used when the USB Bus Power is used. Connect an AC Adaptor in order to use the Power Supply Output Terminal.

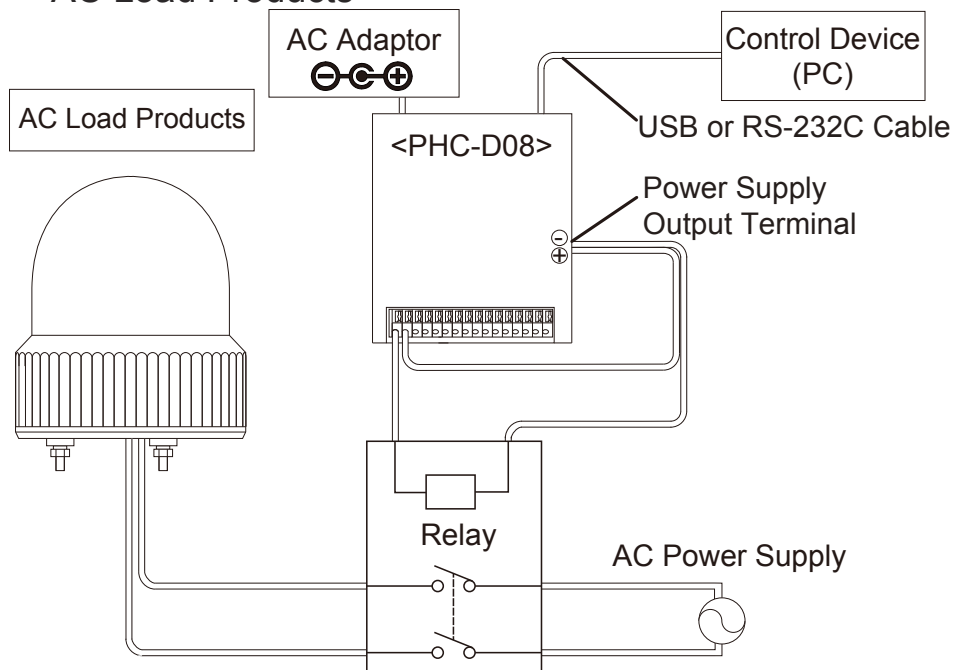
2.8. Wiring Example

The internal contacts are non-voltage relay contacts. Operate the Terminal Buss below a contact capacity of DC30V at 3A. In addition, since each contact is independent, different voltages can be connected to the product for each contact. The Power Supply Output Terminal can supply a maximum current of 500mA at DC24 Volts.

2.8.2.1. <DC Load Products>



2.8.2.2. <AC Load Products>



MEMO

• Use the AC Adaptor when using the Power Supply Output Terminal in the wiring example.

3. Communication Specifications

3.1. Communication Setting

When transmitting a command to this product from a personal computer, be sure to set up the communication settings as followed.

Communication Specification	RS-232C Conformity
Communication Speed	9600bps
Data Length	8 bit
Stop bit	1 bit
Parity	None
Flow Control	None

3.2. Frame Format

The Output Terminal Buss is controllable by transmitting the data in the following format to this product from a personal computer. Because the Identification Number (hereinafter, referred to as "ID") is recorded inside this product, the ID will not change even if the power is turned off.

		Header	ID *	Command	Data	End Code
Send Data	ASCII Code [HEX Code]	@ [40H]	?? [3FH 3FH]	Refer to the list of commands	By command	! [21H]
byte count		1Byte	2Byte	1Byte	0~8Byte	1Byte

* ID (default setting= "??") set for this product is as follows.

When changing the ID number for this product, refer to "3.2.3 Set ID for this Product."

Since "??" can be used to execute a command irrespective of the product's ID, use "??" when executing commands.

3.2.1. <Comand List>

The list of commands and functions which can be used is shown in the table below.

Command	Number of Data bytes	Function
1 [31H]	2Byte	To have the specified Output Terminal ON
0 [30H]	2Byte	To have the specified Output Terminal OFF
? [3FH]	2Byte	To set the ID of this product
S [53H]	8Byte	To control specified Output Terminal as specified conditions
G [47H]	0Byte	To obtain the condition of the Output Terminal
C [43H]	0Byte	To have all Output Terminals OFF
M [4DH]	0Byte	To obtain information on this product

MEMO

- A "1" and "0" Command has compatibility with the PC Output Relay Unit, PHC-100A.
- Since command "S" can control the ON/OFF of the Output Terminals simultaneously, it is recommended to use the "S" command for controlling those operations for this product.
- After sending a control command to the Main Unit as per it's specifications, if the control commands are sent without waiting for the reply data from the Main Unit, it will not operate normally (Which is how it is supposed to operate when a NAK reply is not received).

3.3. Command Explanation

The following are examples on how to send each of the commands from the command list table.

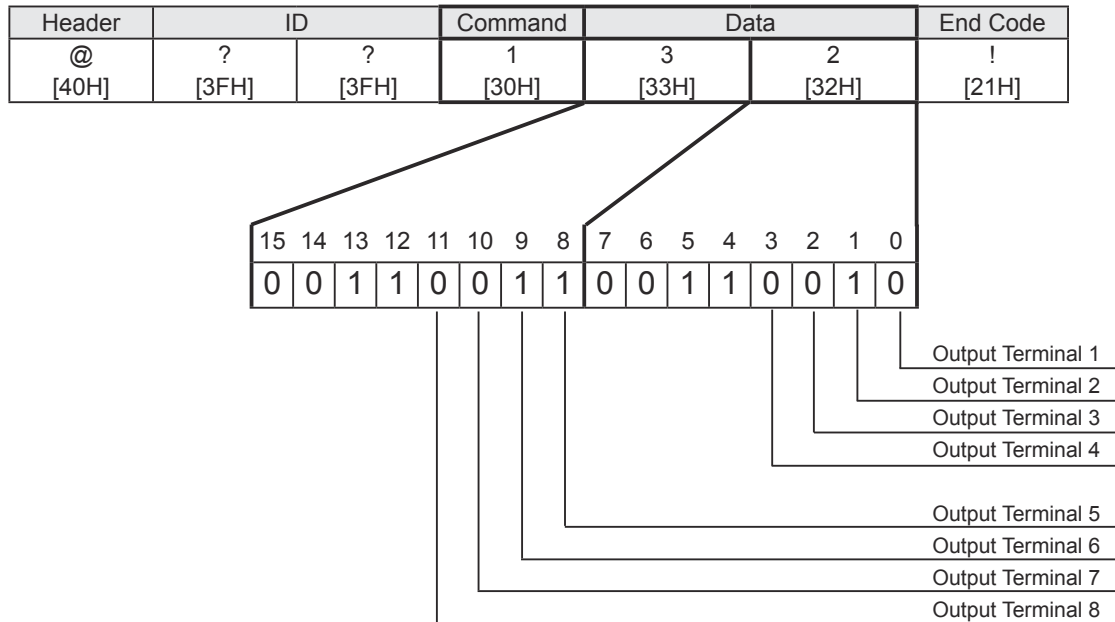
3.3.1. <Turn ON Specified Output Terminals>

Sending data in the following format will control the specified Output Terminal to turn "ON." The bit in the data section specified as 0, will maintain the specified Output Terminal's condition, and the bit in the data section specified as 1 will turn on the specified Output Terminal.

[Transmission Example]

In this example, the Output Terminals 2, 5, and 6 are turned ON.

- Send Data



- Reply Data

Normal Response

Data
ACK [06H]

Response Error

Data
NAK [15H]

The following are conditions which will get a NAK reply and the error contents.

Transmission Condition	Error Contents
Command error	When a command other than on the list of commands is specified
Data error	When data, other than 0[30H] - ?[3FH], is used
Data size error	When the number of bytes in the send data is different
Timeout	Reply interval between data is more than 5 seconds after receipt of header

* Do not transmit the following command, before this product transmits reply data. It may not operate normally.

3.3.2. <Turn OFF Specified Output Terminals>

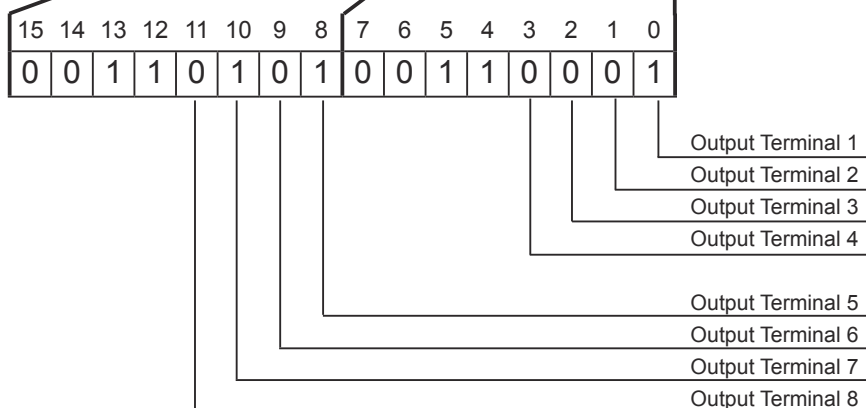
Sending data in the following format will control the specified Output Terminal to turn "OFF." The bit in the data section specified as 0, will maintain the specified Output Terminal's condition, and the bit in the data section specified as 1 will turn off the specified Output Terminal.

[Transmission Example]

In this example, the Output Terminals 1, 5, and 7 are turned OFF.

- Send Data

Header	ID		Command	Data			End Code
@	?	?	0	5	1	!	!
[40H]	[3FH]	[3FH]	[30H]	[35H]	[31H]		[21H]



- Reply Data

Normal Response

Data
ACK
[06H]

Response Error

Data
NAK
[15H]

The following are conditions which will get a NAK reply and the error contents.

Transmission Condition	Error Contents
Command error	When a command other than on the list of commands is specified
Data error	When data, other than 0[30H] - ?[3FH], is used
Data size error	When the number of bytes in the send data is different
Timeout	Reply interval between data is more than 5 seconds after receipt of header

* Do not transmit the following command, before this product transmits reply data. It may not operate normally.

3.3.3. <Set ID for this product>

Sending data in the following form will change the ID of this product. Two ASCII bytes are designated in the data section to change to a new ID. The configuration range for each byte of data in the data section can set up from 0 [30H] to ? [3FH].

[Transmission Example]

In this example, the ID set at 56 [35H 36H] shall be changed to 21 [32H 31H].

- Send Data

Header	ID		Command	Data		End Code
@ [40H]	5 [35H]	6 [36H]	? [3FH]	2 [32H]	1 [31H]	! [21H]

- Reply data

Normal response

Data
ACK [06H]

Response Error

Data
NAK [15H]

The following are conditions which will get a NAK reply and the error contents.

Transmission Condition	Error Contents
Command error	When a command other than on the list of commands is specified
Data error	When data, other than 0[30H] - ?[3FH], is used
Data size error	When the number of bytes in the send data is different
Timeout	Reply interval between data is more than 5 seconds after receipt of header

* Do not transmit the following command, before this product transmits reply data. It may not operate normally.

3.3.4. <Control Specified Output Terminal>

Sending data in the following format will transmit data to control the output terminal conditions to; "OFF", "ON", and "No Change."

The ASCII data is divided into 0 [30H] to designate the output terminal as "OFF", as 1 [31H] to designate it as "ON", and 9 [39H] to maintain the status condition as "No Change."

[Transmission Example]

In this example, Output Terminal 1 is set to ON, Output Terminal 3 set to OFF and all others are unchanged.

- Send data

Header	ID		Command	Data (Output Terminal Block)								End Code
				1	2	3	4	5	6	7	8	
@ [40H]	? [3FH]	? [3FH]	S [53H]	1 [31H]	9 [39H]	0 [30H]	9 [39H]	9 [39H]	9 [39H]	9 [39H]	9 [39H]	! [21H]

- Reply data

Normal response

Data
ACK [06H]

Response Error

Data
NAK [15H]

The following are conditions which will get a NAK reply and the error contents.

Transmission Condition	Error Contents
Command error	When a command other than on the list of commands is specified
Data error	When data, other than 0[30H] - 9[39H], is used
Data size error	When the number of bytes in the send data is different
Timeout	Reply interval between data is more than 5 seconds after receipt of header

* Do not transmit the following command, before this product transmits reply data. It may not operate normally.

3.3.5. <Obtain Output Terminal Condition>

When data is transmitted in the following format, the reply data will return with an 8 byte ASCII value to indicate the Output Terminal Buss status.

When the reply data returns with a 0 [30H], the corresponding output terminal is in the off state; and when a 1 [31H] has returned, the corresponding output terminal is in the ON state.

[Transmission Example]

In this example, Output Terminals 2, 3, and 6 are in the ON state and all others are in the OFF state.

- Send data

Header	ID		Command	End Code
@ [40H]	? [3FH]	? [3FH]	G [47H]	! [21H]

- Reply data

Normal response

Output Terminal Block							
1	2	3	4	5	6	7	8
0 [30H]	1 [31H]	1 [31H]	0 [30H]	0 [30H]	1 [31H]	0 [30H]	0 [30H]

Response Error

Data
NAK [15H]

The following are conditions which will get a NAK reply and the error contents.

Transmission Condition	Error Contents
Command error	When a command other than on the list of commands is specified
Data error	When data, other than 0[30H] - ?[3FH], is used
Data size error	When the number of bytes in the send data is different
Timeout	Reply interval between data is more than 5 seconds after receipt of header

* Do not transmit the following command, before this product transmits reply data. It may not operate normally.

3.3.6. <Turn all Output Terminals OFF>

Sending data in the following format will control all the Output Terminal conditions to turn "OFF."

[Transmission Example]

In this example, all the Output Terminals are turned OFF.

- Send Data

Header	ID		Command	End Code
@ [40H]	? [3FH]	? [3FH]	C [43H]	! [21H]

- Reply Data

Normal response

Data
ACK [06H]

Response Error

Data
NAK [15H]

The following are conditions which will get a NAK reply and the error contents.

Transmission Condition	Error Contents
Command error	When a command other than on the list of commands is specified
Data error	When data, other than 0[30H] - ?[3FH], is used
Data size error	When the number of bytes in the send data is different
Timeout	Reply interval between data is more than 5 seconds after receipt of header

* Do not transmit the following command, before this product transmits reply data. It may not operate normally.

3.3.7. <Obtain Information on this product>

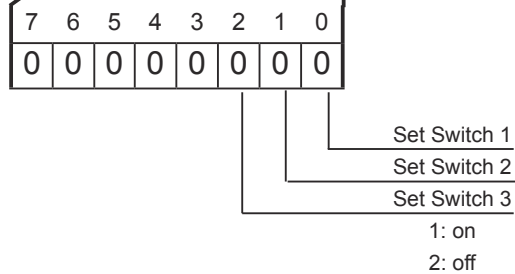
When data in the following format is sent, acquired information, such as the version, ID and switch settings of this product will have a 6 byte ASCII reply.

[Transmission Example]

In this example, the reply data indicates version 1.00, ID of “??”, and the Set Switch has all outputs OFF.

- Send Data

Header	ID		Command	End Code
@ [40H]	? [3FH]	? [3FH]	M [4DH]	! [21H]



- Reply Data
Normal Response

Product information					
Version		ID		Set Switch	Unused
01H	00H	? [3FH]	? [3FH]	[00H]	[00H]

Response Error

Data
NAK [15H]

The following are conditions which will get a NAK reply and the error contents.

Transmission Condition	Error Contents
Command error	When a command other than on the list of commands is specified
Data error	When data, other than 0[30H] - ?[3FH], is used
Data size error	When the number of bytes in the send data is different
Timeout	Reply interval between data is more than 5 seconds after receipt of header

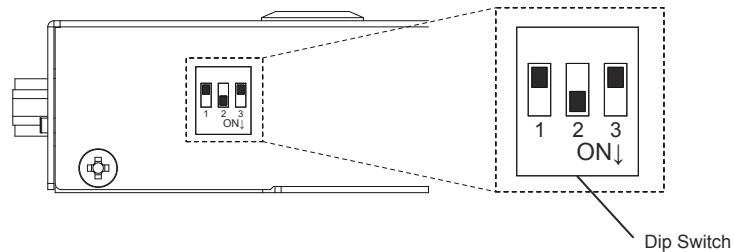
* Do not transmit the following command, before this product transmits reply data. It may not operate normally.

4. Setup Test Mode

The Setup Test Mode can be used to control the Output Terminal only by this product to verify wiring, etc. With the use of the Setup Test Mode, the operation of the link between the Output Terminal and the equipment can be checked from this product.

Below is an explanation on the use of the Setup Test Mode:

1. The “Set” switch, located on the side of this product, has Switch 1 turned OFF, Switch 2 turned ON and Switch 3 turned OFF before the power is switched on.



2. Refer to the table below for the Output Terminal number that coincides with the operation when selected with the “Set” Switch. The Power Supply LED turns on when the selected output terminal is ON and turns off when the selected output terminal is OFF.

Output Terminal Block	Set Switch		
	1	2	3
1	OFF	OFF	OFF
2	OFF	OFF	ON
3	OFF	ON	OFF
4	OFF	ON	ON
5	ON	OFF	OFF
6	ON	OFF	ON
7	ON	ON	OFF
8	ON	ON	ON

3. If the “Clear” switch is pushed, in cases where the output terminal selected with the Mode Switch is OFF, it will change to ON, and, in case it is ON, will change to OFF.
4. To exit the Setup Test Mode, set all “Set” Switches in the OFF position to return to the “Normal Operation Mode” configuration and reapply the power.

5. Specifications

5.1. General Specifications

Model		PHC-D08	AC Adapter included
		PHC-D08N	AC Adapter not included
Rated Voltage		24V DC (Main Unit) 5V DC (USB Bus Power)	
AC Adaptor		Input: 100V - 240V AC (50/60Hz) Output: 24V DC	
Operating Voltage Range		90V - 264V AC (With AC Adaptor used)	
Rated Current Consumption	Standby	7mA (at 24VDC) 18mA (at 5VDC)	
	Maximum	600mA (at 24VDC) 330mA (at 5VDC)	
Rated Power Consumption	Standby	0.4W (at 100VAC) 0.2W (at 24VDC) 0.1W (at 5VDC)	
	Maximum	16W (at 100VAC) 14.5W (at 24VDC) 1.8W (at 5VDC)	
Operating Ambient Temperature		0°C - +40°C	
Operating Ambient Humidity Range		20% - 85%RH (No dew or condensation accumulation)	
Storage Ambient Temperature Range		-10°C - +60°C	
Storage Ambient Humidity Range		20% - 85%RH (No dew or condensation accumulation)	
Mounting Location		Indoor Only	
Mounting Direction		Upright	
Protection Rating		IP 20	
Insulation Resistance		More than 10MΩ at 500VDC between the terminals and the chassis	
Withstand Voltage		1500VAC for 1min between terminals (10mA or less) and chassis without breaking insulation	
Mass (Tolerance ±10%)		370g	
Outer Dimensions		Refer to Outer Dimensional Drawing	
Compliance Standards		RoHS Directive (EN 50581)	
		Conforms to the CE requirements: (EN 55022 (ClassA), EN 55024)	
		FCC Part 15 Subpart B Class A	
		UL/CSA 60950-1 (For PHC-D08N)	
Interface	USB Port	USB 2.0 Conformity (supports Bus Power) Standard B Type (Female)	
	Serial Port	RS-232C Conformity D-Sub 9 pin (Male)	
Communication Method	USB Port	CDC (Communication Device Class) Protocol	
	Serial Port	Asynchronous (Baud Rate: 9600bps, No Parity, Stop Bit=1bit, Data Length: 8bit, No Flow Control)	
External Contact Output		Screwless Terminal Block	
	Number of Contacts	8 Contacts	
	Contact Specifications	Non-voltage Contact (Normally Open)	
	Rated Voltage	30VDC	
	Rated Current	3A	
	Failure Rate P Level	5VDC/ 10mA (at a switching rate of 120 operations per minute)	
	Applicable Wires	Solid: Φ0.4mm - Φ1.2mm (AWG26 - AWG18) Stranded: 0.2mm ² - 0.75mm ² (AWG24 - AWG20) Element Wire Diameter: Φ0.18mm or more	
Power Output		Screwless Terminal Block; 24VDC/500mA or less	
	Applicable Wires	Solid: Φ0.4mm - Φ1.2mm (AWG26 - AWG18) Stranded: 0.2mm ² - 1.25mm ² (AWG24 - AWG16) Element Wire Diameter Φ0.18mm or more	
Control Unit		"Clear" Switch, "Set" Switch	
Accessories		AC Adaptor (PHC-D08 only), Installation Manual, Rubber Feet	
Options		None	

5.2. Functional Specifications

Contact Output Control	Contact outputs are controlled in correspondence to control commands
Identification (ID) Number Setup	The ID set up is controlled in correspondence to control commands, and is recorded in memory
"Clear" Switch	Switches off the Signal Tower lights and buzzer
Power Source Display	The operating status is shown by a power LED
Buzzer Alarm Sound	A slide switch selection of 3 levels (High, Low, Mute) to adjust the buzzer sound
Operating Mode Switch	Operating Modes are changed with a DIP switch
Normal Operation Mode	This mode is used for communication protocol with the PHE
PHU Compatibility Mode	This mode is used to simulate the communications protocol for the PHU
Firmware Rewriting Mode	This mode is used when updating this product's firmware via USB

6. Maintenance and Inspection

► Cleaning

- When cleaning, be sure to disconnect the power before doing so.
- The cleaning of this product should be with a soft cloth and a neutral detergent (such as dish soap), diluted with water and should be wiped lightly. Since it is easy to crack the surface of the product be careful not to wipe with too much strength.
- Do not wipe this product with volatile chemicals, or chemically treated dustcloth containing benzine, thinner etc.
- Do not wipe with a cloth containing too much moisture. If moisture gets inside the product, it can cause short circuiting, electric shock, or fire.
- Periodically remove dust from the electric socket to prevent a fire hazard. By allowing dust to adhere to the power supply terminal, it can be the result of fire or failure from short-circuiting.

► Inspection

- Please check the following contents when inspecting this product.

Inspection Checklist		Inspection Contents
Supplied Power Source	Power Supply Voltage Tolerance	Tolerable Voltage Range should be from AC 100 - 240V
Surrounding Environment	Ambient Temperature	Operating Temperature Range should be from 0 - 40°C
	Ambient Humidity	Operating Humidity Range should be 20 - 80% RH
	Presence of Dust	No dust should be accumulated

7. Replacement Parts

The following is the replacement part list. When inquiring, please ask the store where you purchased this product.

Model Name	Part Name
PHC-D08	Rubber Feet
	AC adapter

8. Troubleshooting

Problem	Check the following
Power supply LED is not illuminated.	Make sure that the AC adapter is connected properly.
	Make sure that the USB cable is connected properly.
	In case the USB hub is used, there is a possibility that the power supply from the PC is not sufficient.
	Make sure that all of setting switches are OFF.
No output from power output terminal.	In case of USB being connected, make sure that it is not operated by USB bus power.
	Make sure that AC adapter is connected properly.
The output terminal block does not work.	Make sure that wiring is done properly.
	Send the following command after receipt of responding data from the main body.
	Make sure that the operation assumed in Installation Test Mode works.
	Make sure that the communication configuration is configured properly.
	Make sure that a straight cable is used.

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