

# Control Unit for LED Light Units PD3-3024-3-PI

With Parallel Communications

## Instruction Guide

Thank you for purchasing a CCS product. To ensure proper use of the product, please read this Instruction Guide before use and keep it for your future reference.



This Control Unit is specifically designed to control the light intensity of CCS LED Light Units. It is mainly used to control LED Light Units that are used for machine vision and industrial inspections.

### Features

- One Control Unit can individually control three different Light Units.
- The light intensity can be manually controlled with a dial on the front panel, or externally controlled using a PLC or machine vision equipment.
- PWM control is used to control the light intensity at a frequency of 125 kHz.
- Data can be written in high-speed with parallel external control.
- External trigger inputs can be used to turn lights ON or OFF, or to strobe lights.
- The Control Unit can be used for CCS LED Light Units with a voltage of 24 V and a power consumption of up to 28 W. The total power consumption of the connected Light Units must be 28 W or less.

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## 1 Important Information for Equipment Safety — Read before Use —

This product has been designed with full consideration of safety. Incorrect usage of the product may result in fire, electric shock, or other serious damages. Observe the following precautions.

The following symbols are used in this instruction guide to indicate and classify the relative importance of warnings and cautions.

	<b>WARNING</b>	Indicates that incorrect usage may result in serious injury or death.		<b>Caution</b>	Indicates that incorrect usage may result in injury or property damage.
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The following symbols in the instruction guide indicate and classify the precautions.

These symbols mean the prohibited action.				These symbols indicate actions that must be performed.	

<b>WARNING</b>	
Do not disassemble or modify the product. Doing so may result in fire or electric shock.	
Do not touch the plugs or switches with wet hands. Doing so may result in electric shock.	
Make sure that the product is free of moisture or any liquid. Doing so may result in fire or electric shock.	
Before connecting or disconnecting cables, make sure that the power source is turned OFF. Not doing so may result in fire or electric shock.	
Do not touch the power cords during lightning. This may result in electric shock.	
If an abnormal condition occurs, such as fuming, heat, smell, or noise, stop using the product immediately, turn OFF the power source and unplug the power cord. Not doing so may result in fire or electric shock.	

<b>Caution</b>	
Do not connect any Light Units other than CCS LED Light Units. Doing so may cause overcurrent and the device may overheat or ignite.	
Always use one of the following power cords. 100 to 120 V range: SVT or SJT, AWG18, length: 3 m max., dielectric strength: 125 V min. 200 to 240 V range: H05VV-F, AWG18, length: 3 m max., dielectric strength: 250 V min.	
Do not use user-made branch cables. Doing so may cause product failure.	
Plug the power cord directly into an AC outlet. Using a power strip or connecting many loads from one electrical outlet may cause fire or electric shock.	
Do not place the product in direct sunlight or in a high-humidity environment. Doing so may result in fire due to internal temperature rise.	
Do not bundle product cables with high-voltage lines or power lines. Allow leeway when installing the cables.	
Always place the product on a stable and flat location. Doing so may result in the product falling or toppling, which may cause malfunction, accidents, or bodily injury.	
Always ground the power cord. Not doing so may cause product failure due to static electricity destroying electrical components including those in the Light Unit.	
Do not drop the product or subject it to impact. Doing so may cause product failure.	
Use Light Units that are suitable for the product ratings. Exceeding the ratings may cause product failure.	
Do not bend cables or jam them between objects when wiring. Doing so may cause product failure.	
Make sure that the length of the extension cable for light output is no longer than 5 m. If the extension cable is longer than 5 m, the voltage will drop due to the DC resistance of the cable, and the light intensity will decrease.	
Do not intentionally short-circuit the positive and negative output terminals.	
Do not disconnect the power cord or disassemble the product during operation. Pulling on the cable may damage the cable and result in fire or electric shock.	
Do not wipe the product with volatiles such as paint thinner or benzene. Discoloration or deterioration of the product surfaces may occur.	
Before moving the product, disconnect all connection cables. Damaging the cables may result in fire or electric shock.	
Use a dry cloth to remove dust or other foreign matter from the electrodes. Failure to do so may result in fire.	
When mounting products in system racks or cases, do not insert the screws more than 5 mm. Doing so may cause short-circuits in internal components.	

## 2 Names of Parts and Installation

### Names and Functions of Parts

#### Setting Switch

Press: Switches between the light intensity setting and lighting mode setting.

Press for at least 2 seconds: Locks the settings.  
Rotate: Sets the light intensity or lighting mode.

#### Digital Window

Displays the setting of the light intensity or the setting of the lighting mode.

#### Setting Indicators

BRT lit: The light intensity can be set.  
PLS lit: The lighting mode can be set.  
LOCK lit: The settings are locked.

#### Channel Selection Switch

Selects L1, L2, or L3.

#### Channel Indicators

L1 lit: Lit when changing settings for Light Unit connected to output connector L1.  
L2 lit: Lit when changing settings for Light Unit connected to output connector L2.  
L3 lit: Lit when changing settings for Light Unit connected to output connector L3.

#### External Control Connector

For external control with parallel communications.

#### Manual/External Mode Selector

Selects manual (MANU) or external (EXT) control mode.

#### Trigger Logic Switch

Selects the logic of the trigger signal

#### External Trigger Input Connector

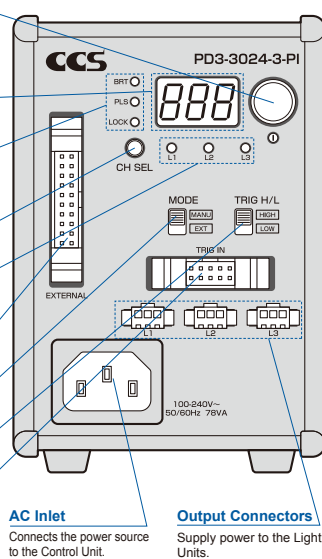
Inputs the ON/OFF signal for ON/OFF Mode.  
Inputs the trigger signal for Strobe Mode.

#### AC Inlet

Connects the power source to the Control Unit.

#### Output Connectors

Supply power to the Light Units.



### Connections



**WARNING** Before connecting the Control Unit, make sure that the main power source is turned OFF. Making connections with the power turned ON may result in a fire or electric shock.

■ **Optional Cables** Three models of optional cables (sold separately) are available. In case using a self-made cable, cable length should be within 3 m at maximum.

- External Control Cable (Model: EXCB2-M20-3)
- External Trigger Input Cable (Model: EXCB2-M10-3)
- External Control/External Trigger Input Cable (Model: EXCB2-M10M20-3). The external control and external trigger input can be connected with one cable.)

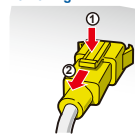
#### Output Connectors (L1 to L3)

##### Connecting



Insert the connector to the Light Unit all the way in.

##### Removing



Press the lock and pull out the connector.

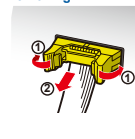
#### External Trigger Input Connector (TRIG IN)

##### Connecting



Press the connector in until it locks in place.

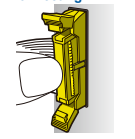
##### Removing



Release the lock and remove the connector.

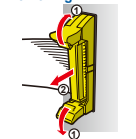
#### External Control Connector (EXTERNAL)

##### Connecting



Press the connector in until it locks in place.

##### Removing

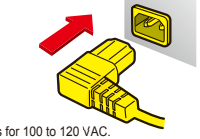


Release the lock and remove the connector.

#### AC Inlet

Connect the power cord to the Control Unit and the AC outlet. The Control Unit will turn ON when power is supplied from the main power source. When the Unit is ON, the digital window will light.

The AC cord that is included with the Unit is for 100 to 120 VAC. We recommend using the following for 200 to 240 VAC. Cable: GTCE-3 x 1.0 mm<sup>2</sup> (manufactured by Kawasaki Electric Wire Company), Connector: KS-31AY (manufactured by Kawasaki Electric Wire Company)



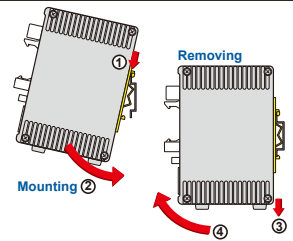
### Mounting the Unit to DIN Rail

#### Mounting to DIN Rail

Hook the tab on the upper part of the Unit on the DIN rail and press the Unit in the direction indicated by arrow 2 while pressing it in the direction indicated by arrow 1.

#### Removing from DIN Rail

Press the Unit down in the direction indicated by arrow 3 and pull it out in the direction indicated by arrow 4.



### Securing the Unit with Base Brackets (Optional, Sold Separately)

Always use Base Brackets (model: BK-PD3) when securing the Unit at its base. If it is secured without the Brackets, the Unit may be damaged.

#### 1 Removing the Rubber Feet from the Bottom of the Unit

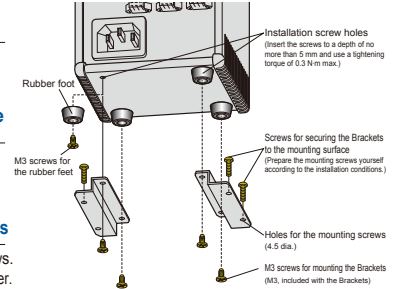
Remove the screws that hold the rubber feet in place using a Phillips screwdriver.

#### 2 Securing the Brackets to the Base of the Unit

Secure the Brackets to the base of the Unit with the four mounting screws that come with the Brackets.

#### 3 Securing the Unit with Mounting Screws

Secure the Unit in place with mounting screws. The mounting screws must be provided by the user.



## 3 What You Can Achieve with This Control Unit

Select the control mode and lighting mode from the following Application Guide and proceed to the indicated reference items.

\* Data that has been set is retained even after the power is turned OFF with manual or external control.

### Application Guide

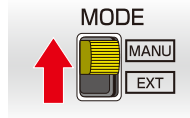
		Control mode	
Lighting mode		 Front panel operation	 External control using a PLC or image process device
Continuous Mode	The Light Units are always ON.		To use manual control in Continuous Mode, refer to items <b>1</b> , <b>2</b> , and <b>3</b> under <b>4 Manual Control</b> .
	To use external control in Continuous Mode, refer to items <b>1</b> , <b>2</b> , and <b>3</b> under <b>6 Control with External Signals</b> .	 External Control Cable (EXCB2-M20-3)	
ON/OFF Mode	The Light Units are turned ON or OFF according to the external trigger signal input.		To use manual control in ON/OFF Mode, refer to items <b>1</b> , <b>2</b> , and <b>3</b> under <b>4 Manual Control</b> and <b>5 Inputting the External Trigger</b> .
	To use external control in ON/OFF Mode, refer to items <b>1</b> , <b>2</b> , and <b>3</b> under <b>6 Control with External Signals</b> and <b>5 Inputting the External Trigger</b> .	 External Trigger Input Cable (EXCB2-M10-3)	
Strobe Mode	The Light Units are turned ON for a set time after the external trigger signal is input.		To use manual control in Strobe Mode, refer to items <b>1</b> , <b>2</b> , <b>3</b> and <b>4</b> under <b>4 Manual Control</b> and <b>5 Inputting the External Trigger</b> .
	To use external control in Strobe Mode, refer to items <b>1</b> , <b>2</b> , <b>3</b> , and <b>4</b> under <b>6 Control with External Signals</b> and <b>5 Inputting the External Trigger</b> .	 External Control/External Trigger Input Cable (EXCB2-M10M20-3)	

## 4 Manual Control

- Make sure that the main power source is turned ON.
- Set items **1**, **2**, and **3** when using Continuous Mode or ON/OFF Mode.
- Set items **1**, **2**, **3**, and **4** when using Strobe Mode.

### 1 Setting the Manual/External Mode Selector to Manual

Set the Manual/External Mode Selector to MANU to set Manual Mode.

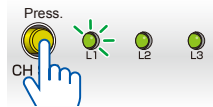


#### Check

Make sure that the LOCK setting indicator is not light and that the trigger logic switch is set to HIGH. Otherwise you may not be able to perform the rest of this procedure.

### 2 Selecting the Channel

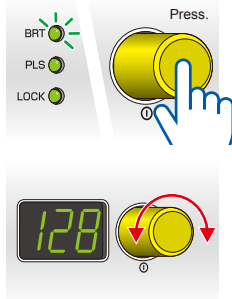
Press the channel selection switch to select the channel to set (L1 to L3). The channel indicators will change.



### 3 Setting the Light Intensity

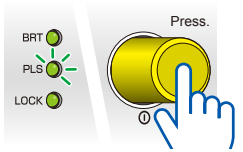
Press the setting switch to light the BRT setting indicator.

Turn the setting switch to set a value between 0 and 255. (Default setting: 255, Minimum: 000, Maximum: 255)  
\* The Light Units are light dimly at the minimum value.



### 4 Selecting the Lighting Mode

Press the setting switch to light the PLS setting indicator.



Turn the setting switch to select the lighting mode from Continuous Mode, ON/OFF Mode, or Strobe Mode.

(Default value: [F00])

#### Continuous Mode

Turn the setting switch and set [F00] to turn ON the Light Units continuously.



#### ON/OFF Mode (If an external trigger is not used, the Light Units are ON continuously.)

Turn the setting switch and set [F00] to turn the Light Units ON and OFF. The Light Units are turned ON or OFF according to the external trigger signal input.

#### Strobe Mode (If an external trigger is not used, the Light Units are OFF.)

To flash the strobe, turn the setting switch and select a setting from [F01 to F10] (strobe time of 40 μs to 40 ms).



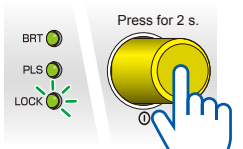
The Light Units are turned ON for the period of time set on the setting switch after the external trigger signal is input.

Digital Window	F00	F01	F02	F03	F04	F05	F06	F07	F08	F09	F10
Status	Continuous Mode ON/OFF Mode	Strobe Mode									
		40 μs	80 μs	120 μs	200 μs	600 μs	1 ms	4 ms	10 ms	20 ms	40 ms

For details on the external trigger input, refer to 5. Inputting the External Trigger.

### Locking Settings

When the setting switch is pressed for 2 seconds or longer, the lighting mode and light intensity settings are locked, and the LOCK setting indicator lights. (The set values can be viewed.) Pressing the switch again for 2 seconds or longer releases the lock.



## 5 Inputting an External Trigger

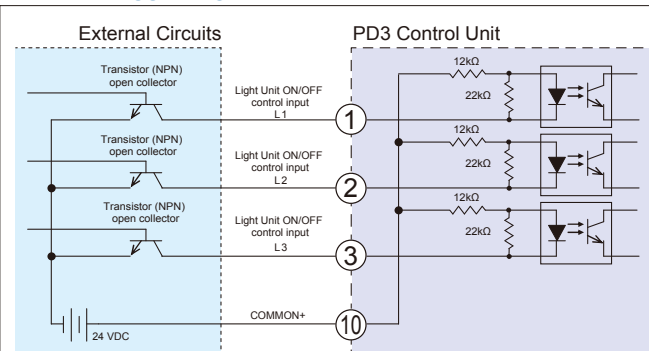
### Input Signal and Photocoupler

The input signal from the external trigger input connector can be used to control the photocoupler inside the Unit to turn the LED Light Units ON and OFF or to control strobe timing.

The operation depends on the setting of the trigger logic switch.

Trigger Logic Switch	Input signal	Photocoupler	ON/OFF Mode	Strobe Mode
HIGH	HIGH	OFF	Light Units ON	Light Units ON for the set time.
	LOW	ON	Light Units OFF	No change
LOW	HIGH	OFF	Light Units OFF	No change
	LOW	ON	Light Units ON	Light Units ON for the set time.

### External Trigger Signal Connection Example

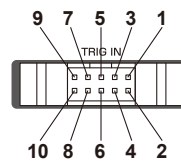


#### Signal Specifications

Rated input voltage: 24 VDC  
Maximum input voltage: 26.4 VDC  
ON voltage/ON current: 14.4 VDC min./3 mA max.  
OFF voltage/OFF current: 5 VDC max./1 mA max.  
ON/OFF response time: 10 μs max.  
Input impedance: 12 kΩ (per terminal)

### Connector Layout

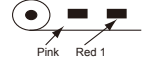
External Trigger Input Connector Plug



No.	Signal	Cable (EXCB2-M10-3/EXCB2-M10M20-3)	
		Wire color	Marks
1	Light Unit ON/OFF control input (L1)	Orange	Black 1
2	Light Unit ON/OFF control input (L2)	Orange	Red 1
3	Light Unit ON/OFF control input (L3)	Gray	Black 1
4 to 9	Not used.	---	---
10	COMMON+	Pink	Red 1

Example: Pin No. 10, pink, red 1

● Enlarged Cable Diagram



### Setting Procedures

With the external trigger input connector pins 1 to 3, select the channels (L1 to L3) where you want to input an external trigger, and input the trigger.

Trigger signals are input from the external trigger input connector in ON/OFF Mode and Strobe Mode are regardless of either Manual Mode or External Mode.

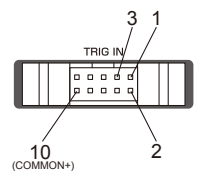
#### ON/OFF Mode

The Light Units are turned ON or OFF according to the external trigger signal input.

#### Strobe Mode

The Light Units are turned ON for the set time after the external trigger signal is input.

Refer to 7. Signal Input Sequence for the sequence diagram.



Specifications for External Control

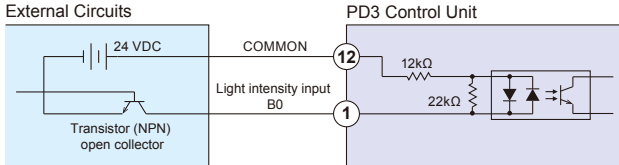
Input Signal and Photocoupler

The input signal from the external control connector turns the photocoupler inside the Control Unit ON and OFF to set and write data. The input signal is compatible with both the sinking and sourcing devices. For a sinking device, the photocoupler is OFF when the input signal is high, and for a source type, the photocoupler is ON when the input signal is high.

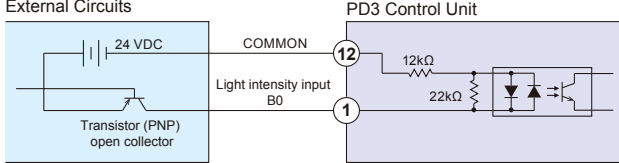
	Signal input	Photocoupler	Data
Sinking	HIGH	OFF	1
	LOW	ON	0
Sourcing	HIGH	ON	0
	LOW	OFF	1

External Signal Connection Example

Sinking

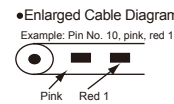
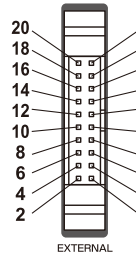


Sourcing



Connector Layout

External Control Connector Plug



No.	Bit	Signal	Cable			
			EXCB2-M20-3 Wire color	EXCB2-M20-3 Marks	EXCB2-M10M20-3 Wire color	EXCB2-M10M20-3 Marks
1	B0	Light Intensity Input (8 bits)	Orange	Black 1	Orange	Black 2
2	B1		Orange	Red 1	Orange	Red 2
3	B2		Gray	Black 1	Gray	Black 2
4	B3		Gray	Red 1	Gray	Red 2
5	B4		White	Black 1	White	Black 2
6	B5		White	Red 1	White	Red 2
7	B6		Yellow	Black 1	Yellow	Black 2
8	B7		Yellow	Red 1	Yellow	Red 2
9	CHSEL0	Channel Selection (3 bits)	Pink	Black 1	Pink	Black 2
10	CHSEL1		Pink	Red 1	Pink	Red 2
11	CHSEL2		Orange	Black 2	Orange	Black 3
12	COMMON		Orange	Red 2	Orange	Red 3
13	BRTWR	Light Intensity Write	Gray	Black 2	Gray	Black 3
14	TRGWR	Lighting Mode Write	Gray	Red 2	Gray	Red 3
15	M0	Lighting Mode Value Input (4 bits)	White	Black 2	White	Black 3
16	M1		White	Red 2	White	Red 3
17	M2		Yellow	Black 2	Yellow	Black 3
18	M3		Yellow	Red 2	Yellow	Red 3
19	OC	Error Output	Pink	Black 2	Pink	Black 3
20	OE		Pink	Red 2	Pink	Red 3

Connection Specifications

- Rated input voltage: 24 VDC
- Maximum input voltage: 26.4 VDC
- ON voltage/ON current: 14.4 VDC min./3 mA max.
- OFF voltage/OFF current: 5 VDC min./1 mA max.
- Response time: 50 μs max.
- Input impedance: 12 kΩ (one terminal)

Setting Procedures

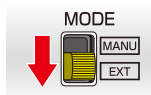
Refer to 7. Signal Input Sequence for the sequence diagram.

- Make sure that the main power source is turned ON.
- Set items 1, 2, and 3 when using Continuous Mode or ON/OFF Mode.
- Set items 1, 2, 3, and 4 when using Strobe Mode.

1 Setting the Manual/External Mode Selector to External

Set the Manual/External Mode Selector to EXT to set External Mode. The value set with external control is displayed on the digital window.

\* Although it is possible to set the external control setting even the manual/external mode selector is set to manual mode, the setting will not be activated until the manual/external mode selector is set to external mode.

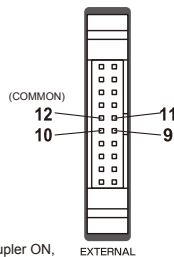


2 Selecting the Channel

Select the channel (L1 to L3) to set. Use pins 9 to 11 (CHSEL0 to CHSEL2) of the external control connector. Refer to the following table for the settings. Input the write signal and hold the setting status until writing is completed.

No.	11	10	9
Bit	CHSEL2	CHSEL1	CHSEL0
L1	0	0	0
L2	0	0	1
L3	0	1	0

0: Photocoupler ON, 1: Photocoupler OFF  
\* Pins 011 to 111 are not valid.

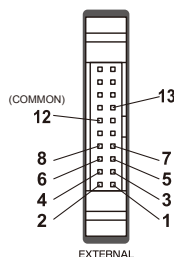


3 Setting the Light Intensity

There are 256 levels to the light intensity. Use pins 1 to 8 (B0 to B7) of the external control connector. Refer to the following table for the settings. Continue writing data. Input a signal to pin 13 (BRTWR) that turns ON the photocoupler for at least 50 μs. After that, turn the photocoupler OFF to complete writing. (Default setting: 000, Minimum: 000, Maximum: 255)

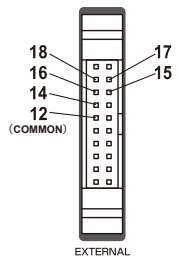
Digital window	B7	B6	B5	B4	B3	B2	B1	B0	Radiant quantity
0	000	0	0	0	0	0	0	0	0
1	001	0	0	0	0	0	0	0	1
2	002	0	0	0	0	0	0	0	1
...	...	...	...	...	...	...	...	...	...
254	254	1	1	1	1	1	1	1	0
255	255	1	1	1	1	1	1	1	1

0: Photocoupler ON, 1: Photocoupler OFF



4 Selecting the Lighting Mode

Select the lighting mode form Continuous Mode, ON/OFF Mode, or Strobe Mode. Use pins 15 to 28 (M0 to M3) of the external control connector. Refer to the following table for the settings. (Default setting: F00 ) Continue writing data. Input a signal to pin 14 (TRGWR) that turns ON the photocoupler for at least 50 μs. After that, turn the photocoupler OFF to complete writing.



Continuous Mode

Refer to the following table and set the lighting mode to Continuous Mode.

ON/OFF Mode (If the external trigger is not used, the Light Units are ON continuously.)

Refer to the following table and set the lighting mode to ON/OFF Mode. The Light Units are turned ON or OFF according to the external trigger signal input.

Strobe Mode (If an external trigger is not used, the Light Units are OFF.)

The strobe time can be set to between 40 μs and 40 ms in Strobe Mode. Refer to the following table for the settings. The Light Units are turned ON for the set time after the external trigger signal is input.

No.	18	17	16	15	Lighting mode
Digital window	M3	M2	M1	M0	
F00	0	0	0	0	Continuous Mode or ON/OFF Mode
F01	0	0	0	1	Strobe Mode (40 μs)
F02	0	0	1	0	Strobe Mode (80 μs)
F03	0	0	1	1	Strobe Mode (120 μs)
F04	0	1	0	0	Strobe Mode (200 μs)
F05	0	1	0	1	Strobe Mode (600 μs)
F06	0	1	1	0	Strobe Mode (1 ms)
F07	0	1	1	1	Strobe Mode (4 ms)
F08	1	0	0	0	Strobe Mode (10 ms)
F09	1	0	0	1	Strobe Mode (20 ms)
F10	1	0	1	0	Strobe Mode (40 ms)

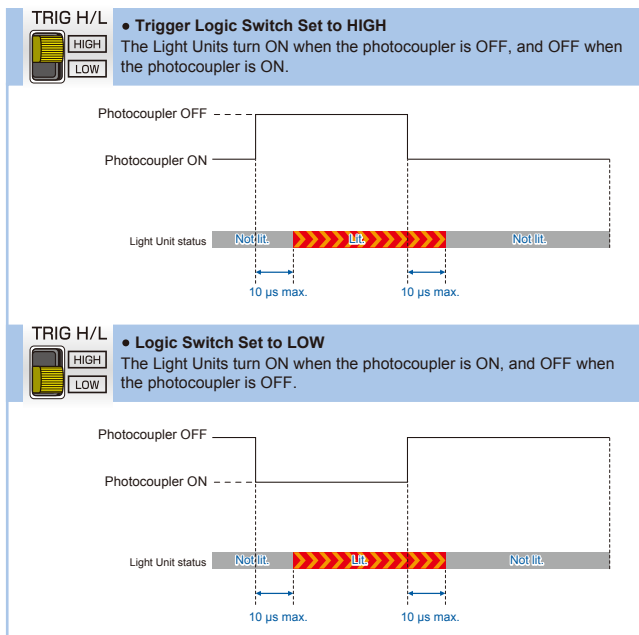
0: Photocoupler ON, 1: Photocoupler OFF  
\* Pins 1011 to 1111 are not valid.

For details on the external trigger input, refer to 5. Inputting the External Trigger.

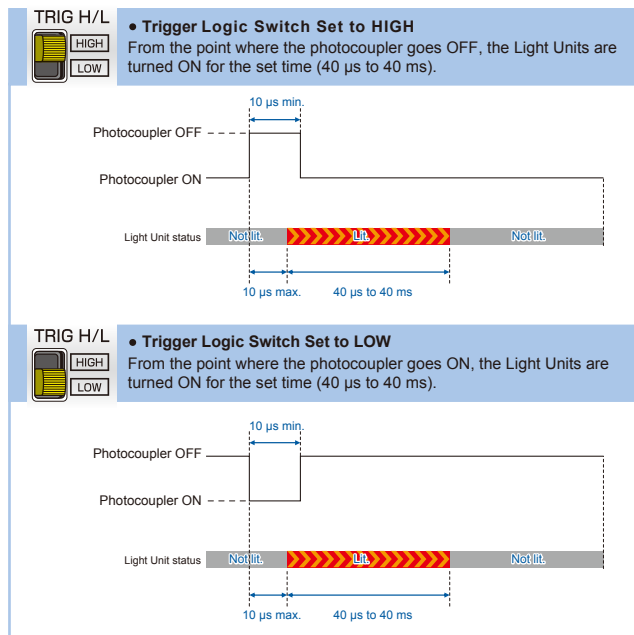
## Trigger Input Sequence Diagram

- If another trigger is input before the Light Unit turns OFF in Strobe Mode, the starting point of the reentered trigger is taken as the start time and the strobe light continues for the set time from that point.

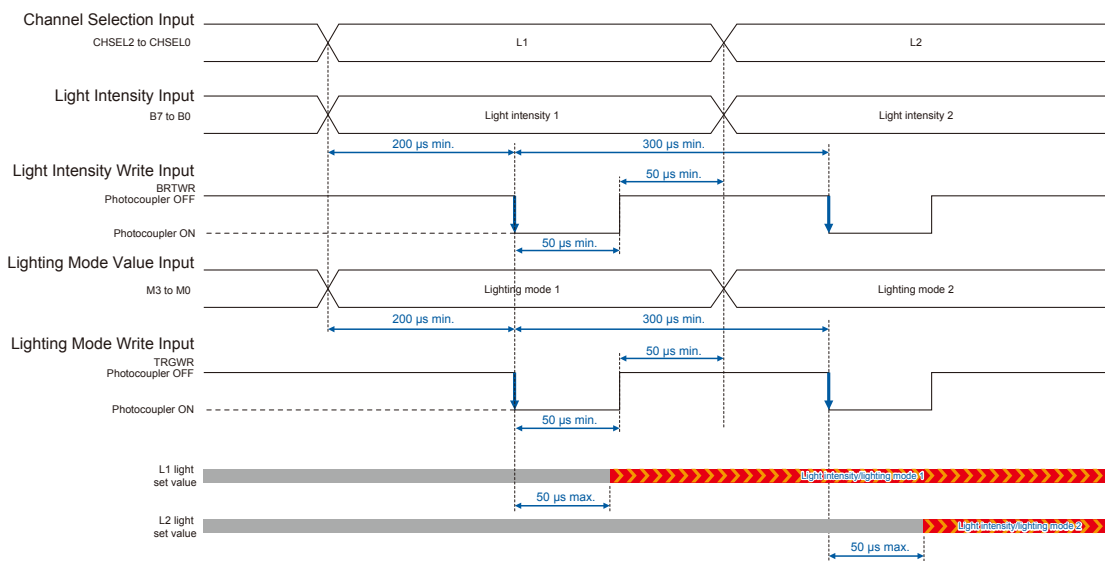
### ON/OFF Mode



### Strobe Mode



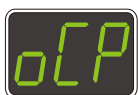
## Sequence Diagram for Writing Data



	Signal input	Photocoupler	Data
Sinking	HIGH	OFF	1
	LOW	ON	0
Sourcing	HIGH	ON	0
	LOW	OFF	1

# 8 Troubleshooting

If the consumption current of Light Units exceeds 107% higher than the rated current, the overcurrent protection operates and stops the output. OCP will be displayed on the digital window. Please check the rated current of Light Units and connect the Light Units under the rated current of this control unit. Please press Setting Switch for over a second to reset the OCP error. (OCP error can be reset by rebooting.)



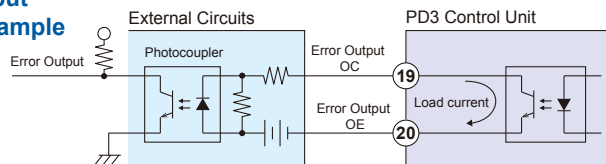
### Error Output

The error status is output from pins 19 and 20 of the external control connector.

Signal Specifications	
Rated input voltage:	24 VDC
Maximum input voltage:	26.4 VDC
Load current:	20 mA max.
Leakage current:	50 µA max.

Normal operation	Error
Pins 19 and 20 are open.	Pins 19 and 20 are closed.

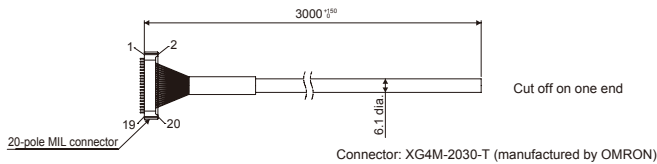
### Error Output Circuit Example



## 9 Optional Accessories (Sold Separately)

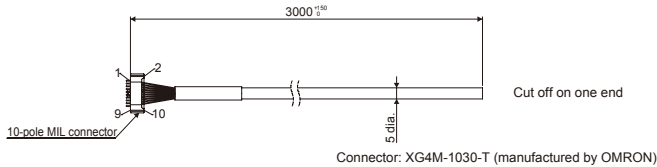
### External Control Cable

Model: EXCB2-M20-3



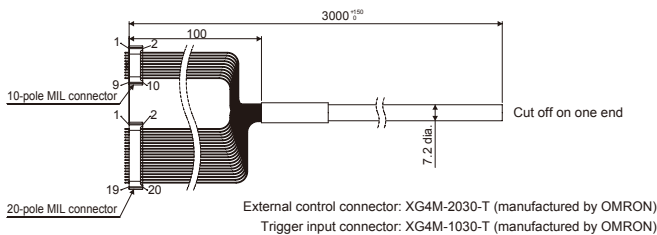
### External Trigger Input Cable

Model: EXCB2-M10-3



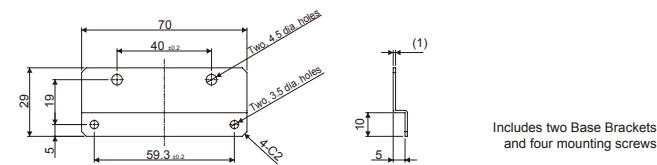
### External Control/External Trigger Input Cable (Common)

Model: EXCB2-M10M20-3



### Base Brackets

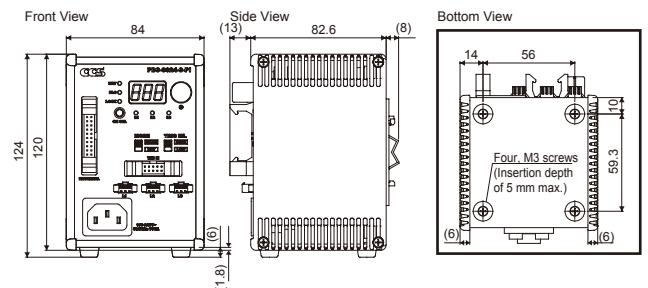
Model: BK-PD3



## 10 Main Specifications

Product name	Digital Control Unit for LED Light Units (with parallel communications)
Model	PD3-3024-3-PI
Applicable Light Unit rating	24 V, 28 W
PWM frequency	125 kHz
Input power	100 to 240 VAC (+10%, -15%), 78 VA, 50/60 Hz
Inrush current (typ.)	15 A (at 100 VAC), 30 A (at 200 VAC) from a cold start
Ground leakage current	3.5 mA max. (264 VAC, 60 Hz, with no load)
Rated output voltage	24 VDC
Rated output current	Total for 3 channels: 1.1 A
Insulation withstand voltage (input-output, input-FG)	1,500 VAC for one minute, cutoff current: 10 mA, 500 VDC, 20 MΩ min.
Operating temperature and humidity	Temperature: 0 to 40°C, Humidity: 20% to 85% (with no condensation)
Storage temperature and humidity	Temperature: -20 to 60°C, Humidity: 20% to 85% (with no condensation)
Vibration resistance	Acceleration: 19.6 m/s <sup>2</sup> , Frequency: 10 to 55 Hz, Cycles: 3 minutes, Sweep cycle: For 1 hour each in X, Y, and Z directions
Cooling method	Natural air cooling
CE Marking	Safety standard: Conforms to EN 61010-1, EMC standard: Conforms to EN 61326, Class A.
Environmental regulations	RoHS compliant
Input connector	AC input: 3-pin inlet EN 60320-1 certified C14 type x 1
Output connectors	Light output: SMP-03V-BC (J.S.T. Mfg. Co., Ltd.) x 3
External Control Connector	Trigger input: MIL connector (MIL-C-83503 compliant), 10-pole For setting the light intensity/lighting mode: MIL connector (MIL-C-83503 compliant), 20-pole
Material and surface processing	Material: Aluminum and resin, Surface processing: Blue alumite
Weight	600 g max.
Accessories	One 2-m long 3-ping power cord with ground terminal, Instruction Guide

## 11 Dimensions



## Environmental Regulation

### EU RoHS Directive

The RoHS Directive is short for the "restriction of use of certain hazardous substances in electrical and electronic equipment." As a directive, it restricts the use of specific hazardous substances for new electrical and electronic equipment marketed in the EU on or after July 1, 2006, and restricts the use of six substances, which are (1) lead, (2) mercury, (3) cadmium, (4) hexavalent chromium, (5) polybrominated biphenyl (PBB), and (6) polybrominated diphenyl ether (PBDE).

\*Standards for "RoHS Directive-Compliant Products"

Lead	Mercury	Cadmium	Hexavalent chromium	PBB	PBDE
1000 ppm max.	1000 ppm max.	100 ppm max.	1000 ppm max.	1000 ppm max.	1000 ppm max.

(Items that are exempted in the RoHS Directive are excluded from these standards.)

### China RoHS Directive

China RoHS Directive is formally known as "Management Methods for Controlling Pollution by Electronic Information Products", which was implemented on March 1, 2007 in China. Same as EU RoHS Directive, this regulation restricts the usage of six substances such as lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyl (PBB), and polybrominated diphenyl ether (PBDE). This regulation requires electronic information products which are manufactured or imported, and sold in China, to clearly disclose contents of the 6 restricted substances listed below.

### Name and Amount of Toxic and Hazardous Substances or Elements

Usage deadline for environmental protection	Product name	Toxic or hazardous substances and elements					
		Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr (VI))	PBB	PBDE
10	Control Unit for LED Lights	×	○	×	○	○	○

○: Indicates that this toxic or hazardous substances contained in all the homogeneous materials for this part, according to SJ/T11363-2006 is within the limit requirement.

×: Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to SJ/T11363-2006, is over the limit requirement.

\*Lead and cadmium are excluded in EU RoHS.

### Usage Deadline for Environmental Protection

The number used in this logo is based on "Management Methods for Controlling Pollution by Electronic Information Products" and related regulations from People's Republic of China. It shows the product usage duration in years for environmental protection. After finishing a product usage, the product needs to be re-used or discarded appropriately following local law and regulations, complying with safety and usage caution.

### 产品中有毒有害物质或元素的名称及含量

环保使用期限	产品	有毒有害物质或元素					
		铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
10	LED 照明专用电源	×	○	×	○	○	○

○: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。

×: 表示该有毒有害物质在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

(注) 铅和镉中的“×”，因欧洲 RoHS 没有限定，故用“○”表示。

### 环保使用期限

此标志的数字是根据中华人民共和国电子信息产品污染控制管理办法以及有关标准等，表示该产品的环保使用期限的年限。遵守产品的安全和使用上的注意，在产品使用后采取适当的方法根据各地法律、规定，回收再利用或进行废弃处理。

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  - IF THE PRODUCT HAS BEEN DAMAGED FROM IMPACTS DUE TO INAPPROPRIATE HANDLING.
  - IF DAMAGE TO THE PRODUCT RESULTS FROM EXTERNAL CAUSES INCLUDING ACCIDENTS, FIRE, POLLUTION, RIOTS, COMMUNICATION FAILURES, EARTHQUAKES, THUNDERSTORMS, WIND AND FLOOD DAMAGE, OR ANY OTHER ACT OF PROVIDENCE, OR FROM ANY EXTRAORDINARY CONDITIONS SUCH AS ELECTRICAL SURGES, WATER LEAKAGE, CONDENSATION, OR THE USE OF CHEMICALS.
  - IF THE DAMAGE RESULTS FROM CONNECTION TO ANY LED LIGHT UNIT OR TO ANY EQUIPMENT WHICH CCS Inc. DOES NOT MANUFACTURE OR DOES NOT SPECIFY FOR USE.
- CCS ASSUMES NO LIABILITY FOR ANY PURCHASER'S SECONDARY DAMAGE (DAMAGE OF EQUIPMENT, LOSS OF OPPORTUNITIES, LOSS OF PROFITS, ETC.) OR ANY OTHER DAMAGE RESULTING FROM A FAILURE OF OUR PRODUCT.

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Ask any product queries to the following address or to your nearest CCS representative.

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