

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

EIA-485 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.
- EIA-485 communications can be used for a maximum transmission distance of 30 m with multidrop connections.
- 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. |
|--|----------------|---|--|----------------|---|

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 and Functions of Parts

### 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.

### ID Switch

Sets the ID for recognition with EIA-485 communications.

### External Control Connector

For external control with EIA-485 communications.

### Manual/External Mode Selector

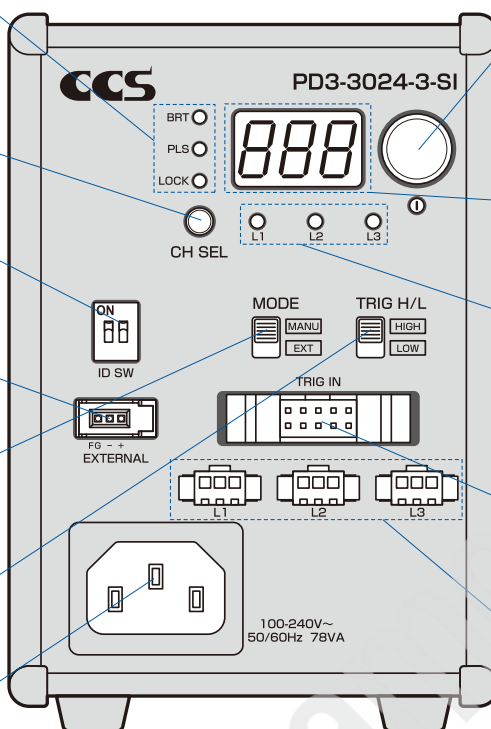
Selects manual (MANU) or external (EXT) control mode.

### Trigger Logic Switch

Selects the logic of the trigger signal.

### AC Inlet

Connects the power source to the Control Unit.



### 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.

### 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 Trigger Input Connector

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

### Output Connectors

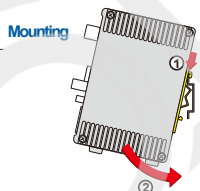
Supply power to the Light Units.

## 3 Installation

### Mounting the Unit to DIN Rail

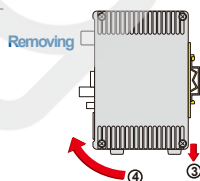
#### ▶ Mounting to DIN Rail

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

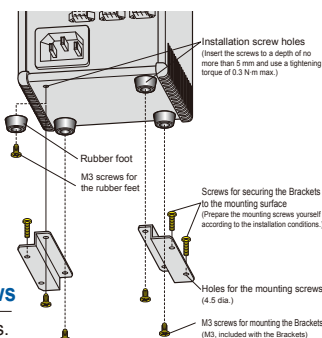
Remove the screws that hold the rubber feet in place using a Phillips screwdriver.

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

Secure the Brackets to the base of the Unit with the four 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.



## 4 Connections

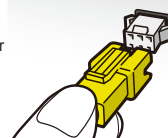


**WARNING** Before connecting the Control Unit, make sure that the main power source is turned OFF. Making connections with the power turned ON may result in a fire or electric shock.

### Output Connectors (L1 to L3)

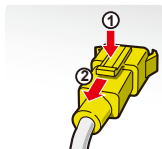
#### Connecting

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



#### Removing

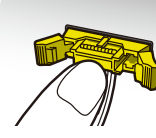
Press the lock and pull out the connector.



### External Trigger Input Connector (TRIG IN)

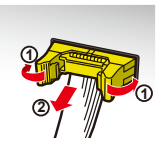
#### Connecting

Press the connector in until it locks in place.



#### Removing

Release the lock and remove the connector.

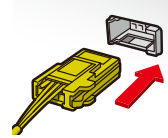


\*An optional External Trigger Input Cable (EXCB2-M10-3) (sold separately) is available. In case using a self-made cable, cable length should be within 3 m at maximum.

### External Control Connector (EXTERNAL)

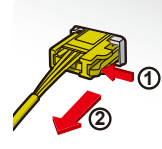
#### Connecting

Firmly insert the connector of the cable.



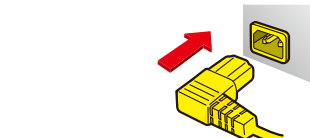
#### Removing

Press the lock and pull out the connector.



\* An Optional External Control Cable (EXCB2-E3-3) (sold separately) is available. In case using a self-made cable, cable length should be within 30 m at maximum.

### 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)

## 5 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  |   | MODE<br>↑<br>MANU<br>EXT | Front panel operation  | MODE<br>↓<br>MANU<br>EXT | External control using a PLC or image process device  |
|---------------|---|--------------------------|--|--------------------------|---|
| Lighting mode | <b>Continuous Mode</b><br>The Light Units are always ON.<br>  |                          | To use manual control in Continuous Mode, refer to items <b>1</b> , <b>2</b> , and <b>3</b> under <b>6 Manual Control</b> .  |                          | To use external control in Continuous Mode, refer to items <b>1</b> and <b>2</b> under <b>7 Control with External Signals</b> .<br>   |
|               | <b>ON/OFF Mode</b><br>The Light Units are turned ON or OFF according to the external trigger signal input.<br><p>* It is possible to turn LED light unit ON and OFF by EIA-485 communications, too.</p> |                          | To use manual control in ON/OFF Mode, refer to items <b>1</b> , <b>2</b> , and <b>3</b> under <b>6 Manual Control</b> and <b>8 Inputting the External Trigger</b> .<br>          |                          | External trigger signal or EIA-485 communications setting can be selected when using ON/OFF mode by external control.<br>To use external trigger signal in ON/OFF mode, refer to items <b>1</b> , and <b>2</b> under <b>7 Control with External Signals</b> and <b>8 Inputting the External Trigger</b> .<br>To use EIA-485 communications setting in ON/OFF mode, refer to items <b>1</b> , <b>2</b> , and <b>4</b> under <b>7 Control with External Signals</b> .<br> |
|               | <b>Strobe Mode</b><br>The Light Units are turned ON for a set time after the external trigger signal is input.<br><p>* When the Trigger Logic Switch is set to HIGH</p>                                 |                          | 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>6 Manual Control</b> and <b>8 Inputting the External Trigger</b> .<br> |                          | To use external control in Strobe Mode, refer to items <b>1</b> , <b>2</b> and <b>3</b> under <b>7 Control with External Signals</b> and <b>8 Inputting the External Trigger</b> .<br>  |

## 6 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.

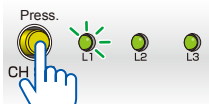


**Check**

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

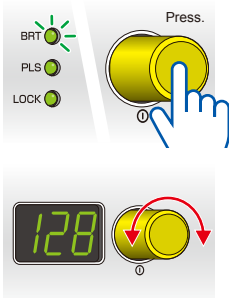
Press the channel selection switch to select the channel to set (L1 to L3). The channel indicators will change.



### 3 Setting the light Intensity

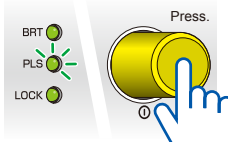
Press the setting switch to light the BRT setting indicator.

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 the 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.

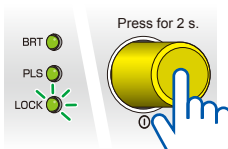


| Digital Window | F00                            | F01         | F02   | F03    | F04    | F05    | F06  | F07  | F08   | F09   | F10   |
|----------------|--------------------------------|-------------|-------|--------|--------|--------|------|------|-------|-------|-------|
| Status         | Continuous Mode<br>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

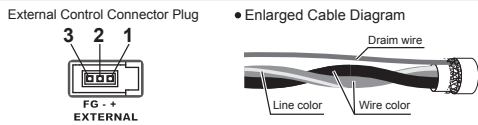
When the setting switch is pressed for 2 seconds or longer, the lighting mode and light intensity settings are locked, and the LOCK setting indicator lights. (The set values can be viewed.) Pressing the switch again for 2 seconds or longer releases the lock.



Specifications for External Control

Sample of Alphanumeric Characters: ABCDEFGHIJKLMNOPQRSTUVWXYZ 0123456789

Connector Layout



| No.        | Signal | Cable (ECXCB2-E3-3) |            |
|------------|--------|---------------------|------------|
|            |        | Wire color          | Line color |
| 1          | I/O+   | Black               | None       |
| 2          | I/O-   | Black               | White      |
| 3 (shield) | FG     | Drain wire          |            |

Communications Specifications

|                         |                   |
|-------------------------|-------------------|
| Communications protocol | EIA-485 compliant |
| Baud rate               | 19,200 bps        |
| Data bit length         | 8 bits            |
| Parity bit              | None              |
| Stop bits               | 1 bit             |

Command Formats

Send Data

| Function                         | Header | Channel specification   | Sent command |   | ID specification                         | Checksum                         | Delimiter | Default                |
|----------------------------------|--------|---|--------------|---|--|----------------------------------|-----------|------------------------|
|                                  |        |   | Instruction  | Data  |  |                                  |           |                        |
| Light Intensity Setting          | @      | 00 to 02<br>(Refer to Channel Specification.)<br>FF: All channels<br>(ON/OFF setting only). | F            | 000 to 255 (000: Minimum intensity, 255: Maximum intensity) | 00 to 03<br>(Refer to ID Specification.) | 00 to FF<br>(Refer to Checksum.) | <CR><LF>  | 000                    |
| Lighting Mode Setting            |        |   | S            | 00 to 10 (Refer to Lighting Mode Settings.)                 |  |                                  |           | 00                     |
| ON/OFF Setting                   |        |   | L            | 0: Not lit, 1: Lit  |  |                                  |           | (Refer to annotation.) |
| Setting Status Check             |        |   | M            | ---   |  |                                  |           | ---                    |
| Status Check (overcurrent check) |        |   | C            | ---   |  |                                  |           | ---                    |
| All Channel Initialization       | R      | 00 (fixed)  | ---          | ---   |  |                                  |           |                        |

\* Specify all numbers in decimal format. \* Send a data within 4 seconds from 'Header' to 'Delimiter', otherwise time-out error occurs and command data will be rejected. \* When operating EIA-485 communications and trigger signal input at same time in ON/OFF mode. When Trigger logic switch is at HIGH: if other controls setting to OFF setting, Light unit will be turned OFF. When Trigger logic switch is at LOW: if other controls setting to ON setting, Light unit will be turned ON. \* ON/OFF setting from EIA-485 communications without regards to trigger logic switch, turned OFF at '0' and ON at '1'. Default setting for trigger logic switch is HIGH = '1(ON)' and LOW = '0(OFF)'. ON/OFF setting will not be held after turning the power off.

Receive Data

| Function                         | Header | Channel specification   | Received command |                                  | ID specification                         | Checksum                         | Delimiter |
|----------------------------------|--------|---|------------------|----------------------------------|--|----------------------------------|-----------|
|                                  |        |   | OK               | NG                               |  |                                  |           |
| Light Intensity Setting          | @      | 00 to 02<br>(Refer to Channel Specification.)<br>FF: All channels<br>(ON/OFF setting only). | O                | ---                              | 00 to 03<br>(Refer to ID Specification.) | 00 to FF<br>(Refer to Checksum.) | <CR><LF>  |
| Lighting Mode Setting            |        |   |                  | 01: Command error                |  |                                  |           |
| ON/OFF Setting                   |        |   |                  | 02: Checksum error               |  |                                  |           |
| Setting Status Check             |        |   |                  | 03: Set value out of range error |  |                                  |           |
| Status Check (overcurrent check) |        |   |                  | 00: Normal, 11: Error            |  |                                  |           |
| All Channel Initialization       |        | ---   |                  |                                  |  |                                  |           |

\* There is no received data when timeout error occurs or ID setting of sent data is out of range. \* Received command for setting status check (F999.S99.L9) F999=Light intensity setting (F000 to F255), S99=Lighting mode setting (S00 to S10), L9=ON/OFF setting (L0: Not lit / L1: Lit)

Channel Specification

| Channel   | L1 | L2 | L3 |
|-----------|----|----|----|
| Set value | 00 | 01 | 02 |

Set values that are higher than 02 are not valid.

Lighting Mode Settings

| Status    | Continuous Mode or ON/OFF Mode |  |     |  |     |  |     |  |     |  | Strobe Mode |  |     |  |     |  |     |  |     |  |     |  |     |
|-----------|--------------------------------|--|-----|--|-----|--|-----|--|-----|--|-------------|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|
|           | Digital window                 |  | F00 |  | F01 |  | F02 |  | F03 |  | F04         |  | F05 |  | F06 |  | F07 |  | F08 |  | F09 |  | F10 |
| Set value | 00                             |  | 01  |  | 02  |  | 03  |  | 04  |  | 05          |  | 06  |  | 07  |  | 08  |  | 09  |  | 10  |  |     |

\* Set values that are higher than 10 are not valid.

ID Specification

| ID switch | Left | Right | Left | Right | Left | Right | Left | Right |
|-----------|------|-------|------|-------|------|-------|------|-------|
|           | ON   | ON    | OFF  | ON    | ON   | OFF   | OFF  | OFF   |
| Set value | 00   | 01    | 02   | 03    |      |       |      |       |

Checksum

The codes of the ASCII characters from the header to the ID are added, the lowest byte is converted to hexadecimal, and two characters are sent.

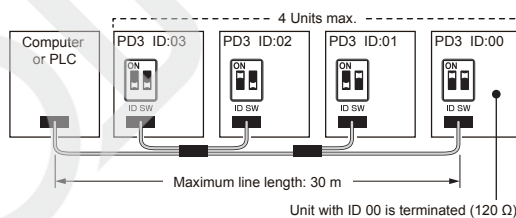
Example: Setting the Light Intensity of Channel 2 to 125 for the PD3 with an ID 00

| Character           | Header |        | Channel |        |        |        | Sent command |        |        |         | ID      |  | Total |
|---------------------|--------|--------|---------|--------|--------|--------|--------------|--------|--------|---------|---------|--|-------|
|                     | Byte 1 | Byte 2 | Byte 3  | Byte 4 | Byte 5 | Byte 6 | Byte 7       | Byte 8 | Byte 9 | Byte 10 | Byte 11 |  |       |
| ASCII (hexadecimal) | 40 hex | 30 hex | 31 hex  | 46 hex | 31 hex | 32 hex | 35 hex       | 30 hex | 30 hex | 1DF hex |         |  |       |

\* The lowest byte (two characters) of 1DF is taken, so the checksum is DF.

Connections and ID Settings

The Control Units are identified with the ID switch settings. Up to four Units can be connected to one signal line. The EIA-485 communications circuit will be terminated inside the Control Unit if the ID switch is set to 00 (left and right pins ON). Always connect a PD3 that has the ID switch set to 00 to the end of the connection line. Also make sure that each ID is used only once on the same signal line.



No. of connected units and junction cable  
When using more than two products to be connected, please use the external control junction cable (optional, sold separately).  
First unit : "EXCB2-E3-3" x1  
Second units: "EXCB2-E3-3" x1 + "EXCB2-E3-E3-0.2" x2 + "ECNR-E3CN4" x1  
Third units: "EXCB2-E3-3" x1 + "EXCB2-E3-E3-0.2" x3 + "ECNR-E3CN4" x1  
Fourth units: "EXCB2-E3-3" x1 + "EXCB2-E3-E3-0.2" x5 + "ECNR-E3CN4" x2

Setting Procedures

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

Specify the ID and the channel, and set the light intensity.

| Setting example   | Send data       | Receive data when OK | Receive data when NG   |
|---|-----------------|----------------------|--|
| Setting the light intensity to 75 for L3 of the PD3 that has the ID set to 00 | @02F07500E4CRLF | @0200051CRLF         | @02N0300B3CRLF<br>(when there is a set value out of range error) |

3 Setting the Lighting Mode

Specify the ID and channel, and set the lighting mode.

| Setting example  | Send data      | Receive data when OK | Receive data when NG   |
|--|----------------|----------------------|--|
| Setting the lighting mode to Strobe Mode at 200 μs for L2 of the PD3 that has the ID set to 00 | @01S0400B8CRLF | @01O0050CRLF         | @01N0300B2CRLF<br>(when there is a set value out of range error) |

4 To Set ON/OFF Signal in ON/OFF Mode

Specify the ID and the channel, and set ON/OFF signal.

| Setting example  | Send data     | Receive data when OK | Receive data when NG   |
|--|---------------|----------------------|--|
| To turn all light units OFF of the PD3 that has the ID set to 00 | @FFL000A8CRLF | @FF0007BCRLF         | @FFN0300DDCRLF<br>(when there is a set value out of range error) |

To Check the Setting Status

When checking the setting status, send the following command after specify the ID and the channel.

| Setting example  | Send data    | Receive data when OK  | Receive data when NG   |
|--|--------------|---|--|
| To check the setting status for L1 of the PD3 that has the ID set to 00. | @00M004DCRLF | @00OF075.S04.L000C0CRLF<br>(If Intensity=75, Strobe mode=200μs, Light unit=OFF) | @00N0300B1CRLF<br>(when there is a set value out of range error) |

Checking the Unit Status

Specify the ID and send the following command to check the unit status.

| Setting example  | Send data    | Receive data when OK       | Receive data when NG   |
|--|--------------|----------------------------|--|
| Checking the status of the PD3 that has the ID set to 00 | @00C0043CRLF | @00O0000AFCRLF<br>(normal) | @00N0300B1CRLF<br>(when there is a set value out of range error) |

Resetting the Light Intensity and Lighting Mode

To restore the external control setting to default value, send the following command after specify the ID.

| Setting example   | Send data    | Receive data when OK | Receive data when NG   |
|---|--------------|----------------------|--|
| Restoring all channels back to default values for the PD3 that has the ID set to 00 | @00R0052CRLF | @00O004FCRLF         | @00N0300B1CRLF<br>(when there is a set value out of range error) |

## 8 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.

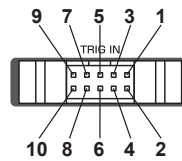
The operation depends on the setting of the trigger logic switch.

| 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. |

\* When operating trigger signal input and EIA-485 communications at same time in ON/OFF mode. When Trigger logic switch is at HIGH: if either controls setting to OFF setting, Light unit will be turned OFF. When Trigger logic switch is at LOW: if either controls setting to ON setting, Light unit will be turned ON.

### ▶ Connector Layout

External Trigger Input Connector Plug

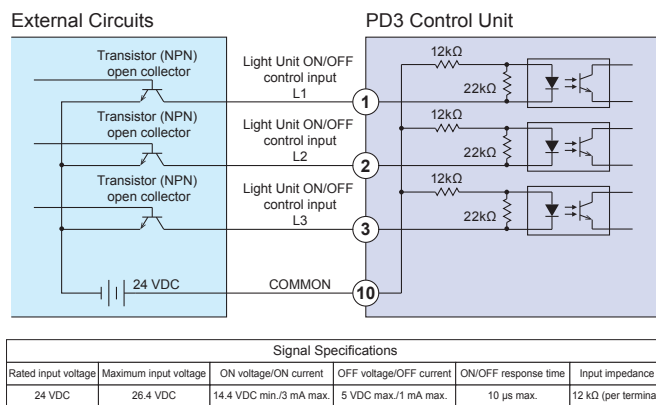


| No.    | Signal                               | Cable (EXCB2-M10-3) |         |
|--------|--------------------------------------|---------------------|---------|
|        |                                      | Wire color          | Marks   |
| 1      | Light Unit ON/OFF control input (L1) | Orange              | 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



### ▶ External Trigger Signal Connection Example



### ▶ 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.

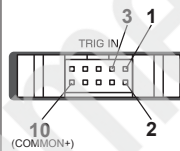
Trigger signals are input from the external trigger input connector in ON/OFF Mode and Strobe Mode in both Manual Mode or External Mode.

#### 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.



### ▶ Trigger Input Sequence Diagram

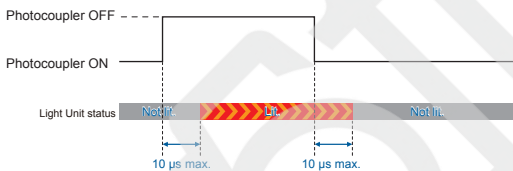
- If another trigger is input before the Light Unit turns OFF in Strobe Mode, the starting point of the reentered trigger is taken as the start time and the strobe light continues for the set time from that point.

#### ON/OFF Mode



##### ● Trigger Logic Switch Set to HIGH

The Light Units turn ON when the photocoupler is OFF, and OFF when the photocoupler is ON.

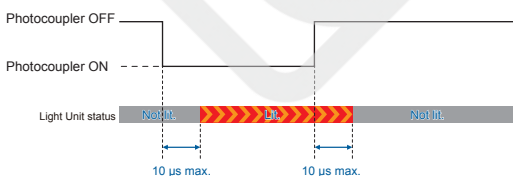


\* The LED Light Unit will turn off by OFF signal sent by either trigger signal input or EIA-485 communications.



##### ● Trigger Logic Switch Set to LOW

The Light Units turn ON when the photocoupler is ON, and OFF when the photocoupler is OFF.



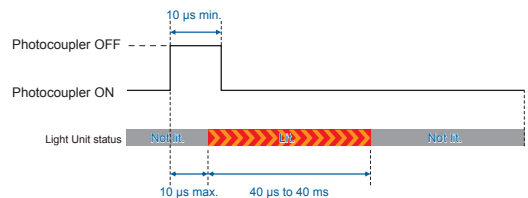
\* The LED Light Unit will turn on by ON signal sent by either trigger signal input or EIA-485 communications.

#### Strobe Mode



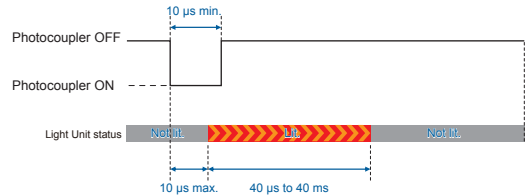
##### ● Trigger Logic Switch Set to HIGH

From the point where the photocoupler goes OFF, the Light Units are turned ON for the set time (40 μs to 40 ms).



##### ● Trigger Logic Switch Set to LOW

From the point where the photocoupler goes ON, the Light Units are turned ON for the set time (40 μs to 40 ms).



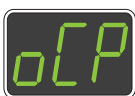
## 9 Troubleshooting

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

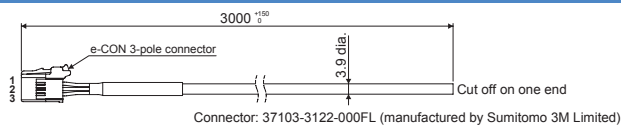
When detecting the error during external control, command will be received as acknowledgement for checking status (over current confirmation) command "C".

For details, refer to 7. Control with External Signals.

## 10 Optional Accessories (Sold Separately)

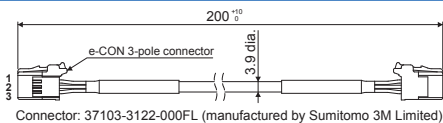
### External Control Cable

Model: EXCB2-E3-3

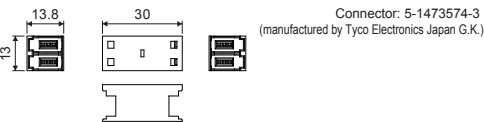


### External Control Junction Cable

External Control Junction Cable  
Model: EXCB2-E3-E3-0.2

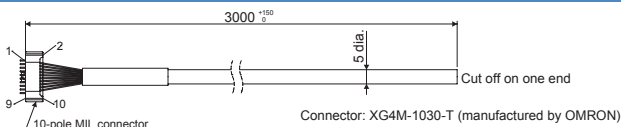


Junction Connector  
Model: ECNR-E3CN4



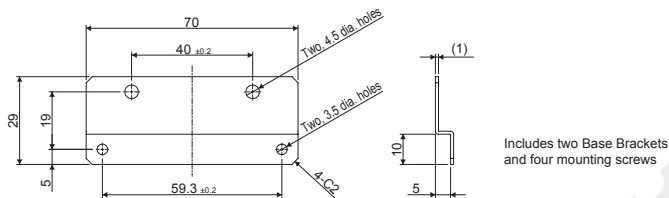
### External Trigger Input Cable

Model: EXCB2-M10-3



### Base Brackets

Model: BK-PD3



## 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至少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。

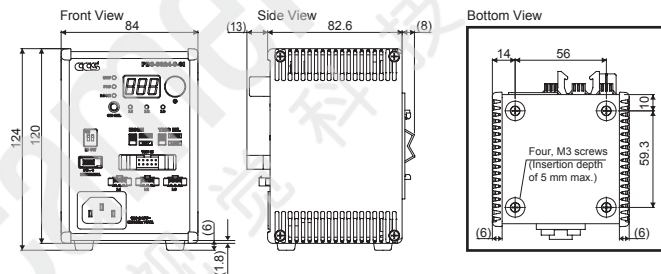
### 环保使用期限

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, 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。

## 11 Main Specifications

|   |   |
|---|---|
| Product name  | Digital Control Unit for LED Light Units (with EIA-485 communications)  |
| Model   | PD3-3024-3-SI   |
| 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 MQ 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 × 1   |
| Output connectors                                     | Light output: SMP-03V-BC (J.S.T. Mfg. Co., Ltd.) × 3  |
| External control connector                            | Trigger input: MIL connector (MIL-C-83503 compliant), 10-pole<br>For setting the light intensity and lighting mode: e-CON 3-pole        |
| Material and surface processing                       | Material: Aluminum and resin, Surface processing: Blue alumite  |
| Weight  | 600 g max.  |
| Accessories   | One 2-m long 3-prong power cord with ground terminal, Instruction Guide   |

## 12 Dimensions



## Warranty Information

EXCEPT FOR THE EXPRESS WARRANTIES STATED IN THIS DOCUMENT, CCS MAKES NO ADDITIONAL WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, AS TO ANY MATTER WHATSOEVER. IN PARTICULAR, ANY AND ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED. EXCEPT AS EXPRESSLY SET FORTH HEREIN, CCS MAKES NO WARRANTIES WITH RESPECT TO THE PRODUCTS.

### WARRANTY PERIOD: TWO YEARS, STARTING FROM CCS Inc. SHIPPING DATE.

CCS Inc. WILL REPAIR OR REPLACE THE PRODUCT FREE OF CHARGE IF IT SHOULD FAIL TO FUNCTION WITHIN THE SPECIFIED WARRANTY PERIOD. IF EITHER OF THESE CONDITIONS OCCURS, PLEASE TAKE THE PRODUCT TO YOUR CCS SALES REPRESENTATIVE.

### WARRANTY TERMS

1 CCS Inc. WILL REPAIR OR REPLACE THE PRODUCT FREE OF CHARGE IF IT SHOULD FAIL TO FUNCTION UNDER USE ON OUR SPECIFIED CONDITION IN ACCORDANCE WITH THE INSTRUCTION GUIDE AND OTHER WRITTEN CAUTIONS DURING THE INDICATED WARRANTY PERIOD OF TWO YEARS.

2 CCS Inc. WILL CHARGE A REPAIR FEE UNDER THE FOLLOWING CONDITIONS:  
 1) IF THE PRODUCT HAS BEEN SUBJECTED TO MISUSE, UNAUTHORIZED REPAIRS, OR MODIFICATION FROM ITS ORIGINAL DESIGN.  
 2) IF THE PRODUCT HAS BEEN DAMAGED FROM IMPACTS DUE TO INAPPROPRIATE HANDLING.  
 3) 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.  
 4) 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.

3 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.

THIS WARRANTY INFORMATION PROVIDES THE SCOPE OF CCS'S PRODUCT WARRANTY WITHIN THE SPECIFIED PERIOD, AND DOES NOT INDICATE OR IMPLY ANY FURTHER GUARANTEE BEYOND THE WARRANTY TERMS.

CONTACT CCS FOR INQUIRIES OR INFORMATION ON REPAIRS TO THE PRODUCT AFTER THE EXPIRATION OF THE WARRANTY.

### Do not use the product in the following situations.

- Under conditions or in an environment not described in this instruction guide.
- In nuclear energy control systems, railroad systems, aviation systems, vehicles, combustion equipment, medical equipment, amusement machines, or safety equipment.
- In applications involving serious risk to life or property, particularly applications demanding a high level of safety.

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

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Use our website to find your nearest CCS representative. <http://www.ccs-grp.com/mvad/>