CREATING CUSTOMER SATISFACTION

Digital Control Units for LED Light Units

PD4 Series Total of 8 Models

Output power **60 W/120 W**	No. of channels **2/4 CH**
Communication Method **Ethernet Parallel**	**PLCCOM Communication**
Intensity value **1,024 steps**	Power input **AC**

Evolved Functionality and Convenience

Equipped with a full range of lighting control functions

Digital control unit designed for ease of use in manufacturing sites

CE UKCA

PD4-12024-4-E

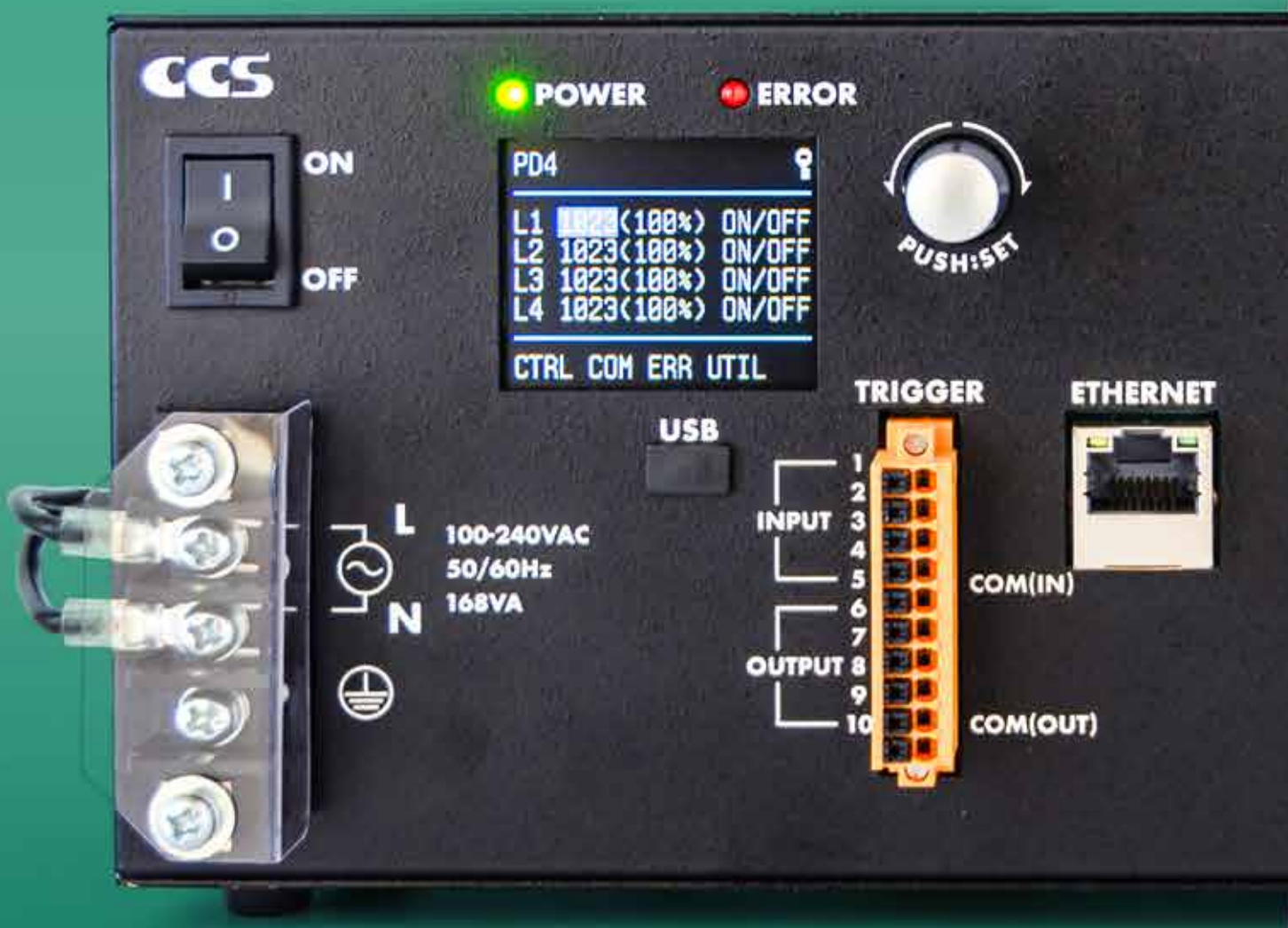
LIGHTING SOLUTION

CCS Inc.

PD4 Series

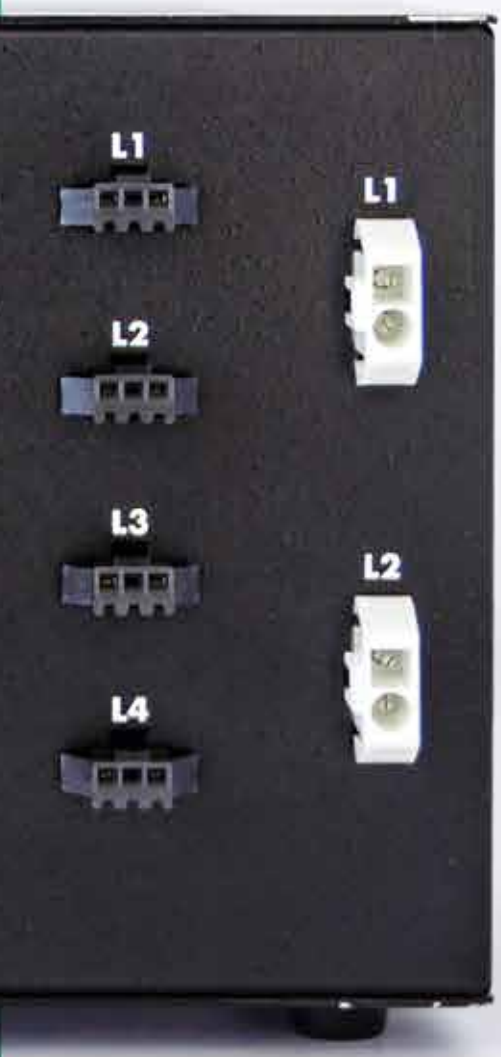
A new stage for LED light digital control units

Introducing a new standard model equipped with sequence control and PLCCOM communication functions that **responds to increasingly sophisticated FA environments.**



Features of PD4 Series

- Lighting output of **60 W/120 W** available
- Number of channels: **2 channels / 4 channels**
- **Ethernet / parallel** external control
- Parallel type supports **both NPN and PNP connections**
- **1,024 steps** of precise **intensity settings**
- All types have **natural air cooling** for easier installation
- Utilizes **color LCD** for easy operation and display



PD4-12024-4-E

Lighting Control Functions

Significantly improved control system functionality enabling easy configuration of advanced settings

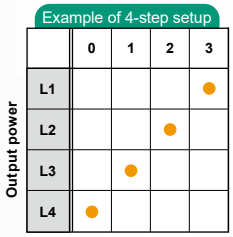
1 Application

Various parameters can be easily set.

> P.3

2 Sequence Feature

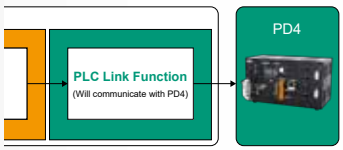
Maximum 16 steps of pattern emission can be set.



> P.4

3 PLCCOM Communication

Data link to a specific PLC is possible. Easy to install in a PLC operating environment.



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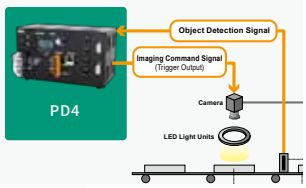
4 Trigger Output Mode

Equipped with trigger signal output function.
Trigger signal input / output can be performed with 1 control unit.



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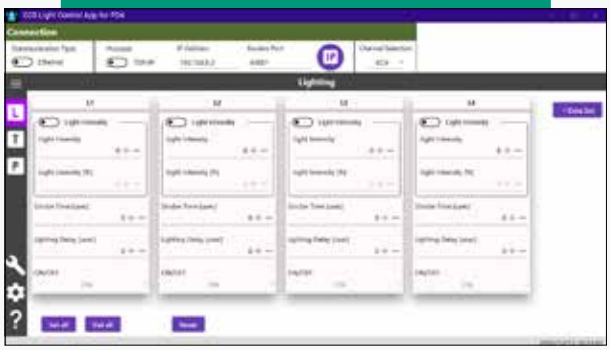
Application

Patent Filed

▷ Easy to configure lighting parameters

Two versions: basic version and standard version.

Basic Version



Basic lighting settings such as intensity value and light emission time, as well as trigger input / output settings.

Standard Version

In addition to the functions of the basic version, all functions of the PD4 Series can be configured, including sequence control, real-time monitoring functions, etc.

* The standard version application is for the PD4 only.

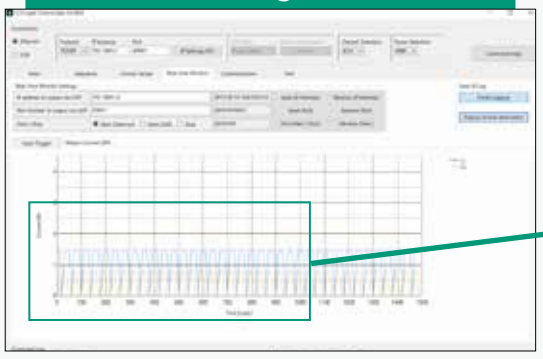
* The application can be downloaded from the web page. System Requirements: Windows 10 / NET Framework 4.7.2
https://www.ccs-grp.com/products/series/371

Real-Time Monitoring Function (When connected via USB, Ethernet)

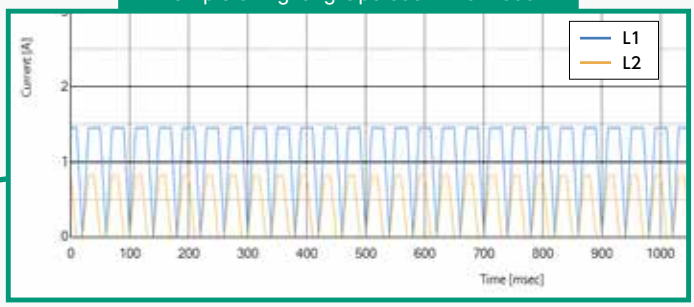
▷ Real-time monitoring of information such as lighting operation status, operation logs, etc.

Review lighting operation information for verifying lighting status during operation and for cause analysis when a problem occurs.

Monitoring Screen



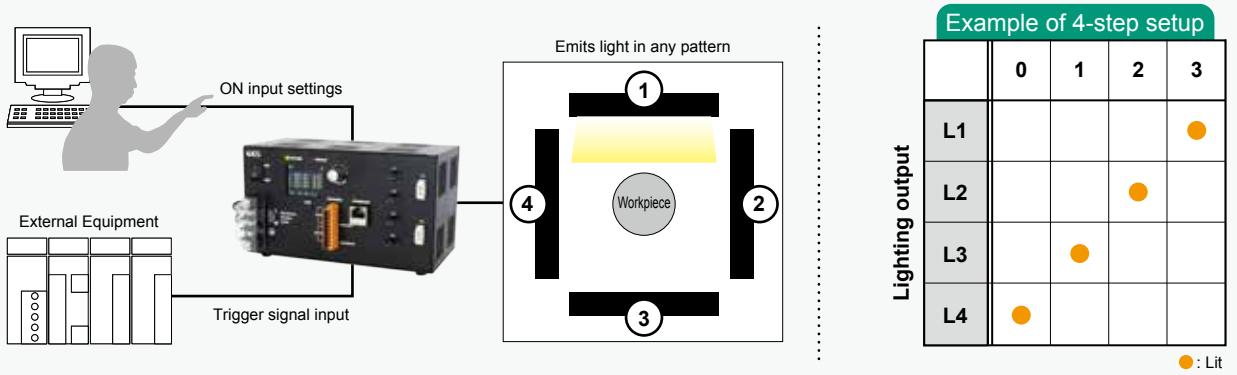
Example of Lighting Operation Information



Sequence

▷ Turn lights on in desired pattern with sequence control function

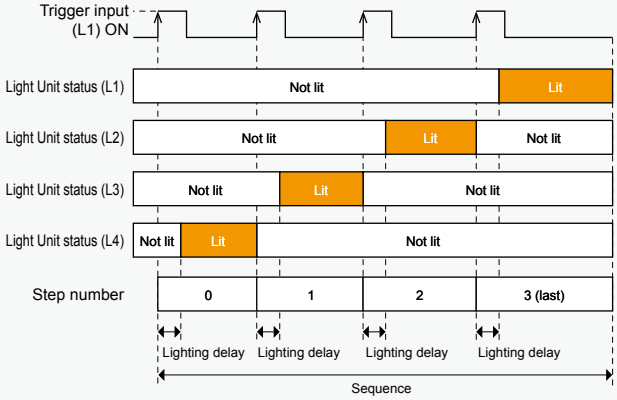
Program up to 16 steps of ON input for a pattern of light emission.
For example, when using 4-quadrant bar lights or segmented lights to illuminate from multiple directions, the emission patterns for each channel can be stored and switched ON / OFF by trigger input.



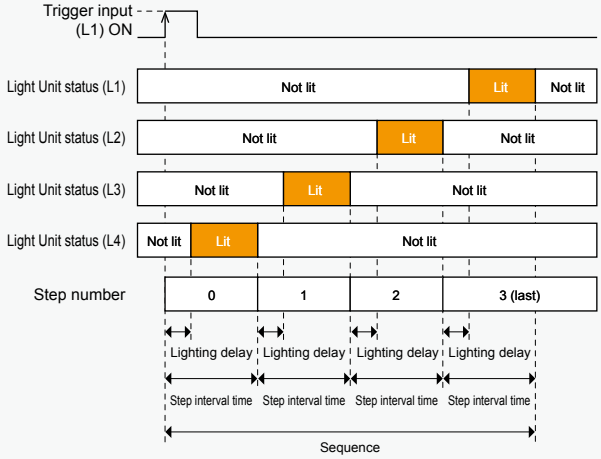
Difference in lighting operation depending on trigger operation mode setting values

Program a maximum of 16 steps of ON input.
Sequence operation can be performed with multiple steps per trigger or 1 step per trigger.

■ When the Set Value of the Trigger Operation Mode Is 1-Trigger 1-Step Sequence Operation



■ When the Set Value of the Trigger Operation Mode Is 1-Trigger N-Steps Sequence Operation

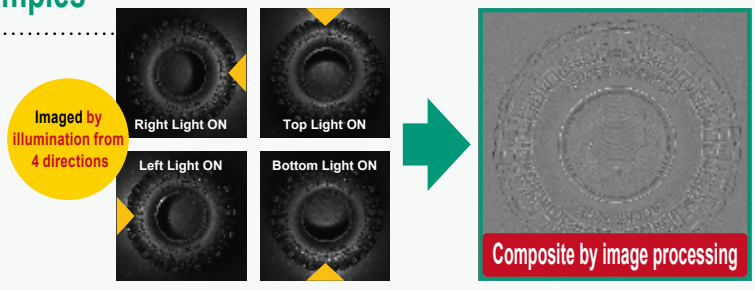


Sequence Control Application Examples

Imaging using photometric stereo method

The workpiece is illuminated and imaged in each direction.
It is possible to generate images that highlight only the unevenness or extract only the pattern by using the differences of each captured image.

■ Imaging Example (4 Divisions)



For details, see "Sequence Control" on page 10 of the operation manual. (Downloadable from the web page. https://www.ccs-grp.com/products/series/371)

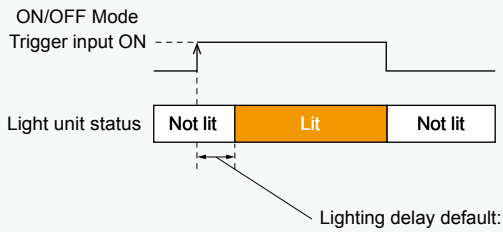
Lighting Modes

▷ Continuous lighting, ON/OFF mode, or strobe mode

The user can select between continuous lighting which is always on, ON/OFF lighting that lights up depending on trigger input, or strobe lighting.

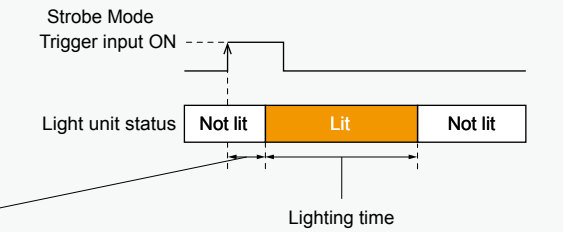
ON/OFF Mode

Lights up when the trigger signal is ON and turns off when the signal is OFF.



Strobe Mode

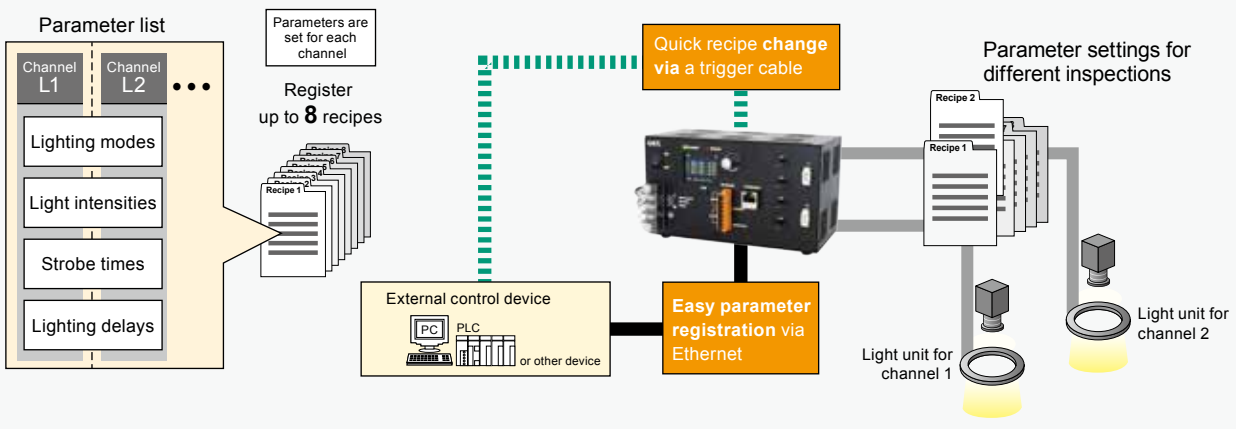
Lights up for a set time period when the trigger signal is ON.



Recipes

▷ Save lighting settings in a maximum of 8 recipes

Parameter settings such as intensity values for each channel and other inspection-specific parameter settings can be registered in advance, allowing for easy setting changes simply by recalling recipes.



PLCCOM Communication

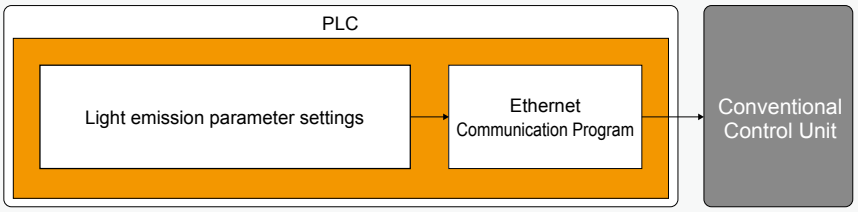
▷ Supports PLC link function for easy integration with PLCs

PLCCOM communication allows the product to be controlled by reading and writing memory areas on the PLC via Ethernet. Easy to install because there is no need to create a program specifically for the control unit.

Without PLCCOM Communication <For Conventional Control Units>

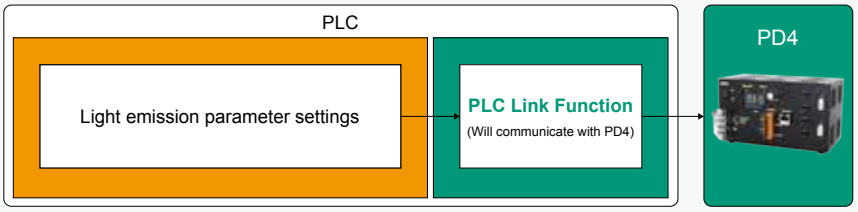
User programmable range　Functions loaded in the PLC

A program is needed to communicate with the control unit separately from the various lighting parameter settings.



With PLCCOM Communication <For PD4>

Can be connected via the PLC function, **so there is no need to build a communication program**



PLCCOM Communication Specifications

For PLCs supporting MC protocol	For PLCs supporting FINS commands
●**Device** : Data register ●**Protocol** : MC protocol for MELSEC-Q series ●**Frame** : 3E frame ●**Transmission code** : Binary ●**Transport** : TCP or UDP	●**I/O Memory** : DM Area ●**Protocol** : FINS Commands ●**Transmission code** : Binary ●**Transport** : TCP or UDP ●**FINS node address** : For the TCP setting, specify the address that is automatically assigned by the PLC. For the UDP setting, specify the 4th octet of the IP address of the Control Unit. (E.g. When the IP address is 192.168.0.123, specify 123.)

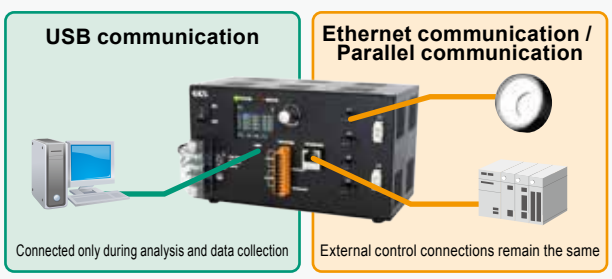
For details, see "Overview of PLCCOM Communication" on page 33 of the operation manual.

USB Communication

▷ Equipped with a USB connector to enable data communication with a PC while connected to external control devices

Various settings and operations can be verified via USB communication.
Use a USB cable with a ferrite core.

USB Connection Image

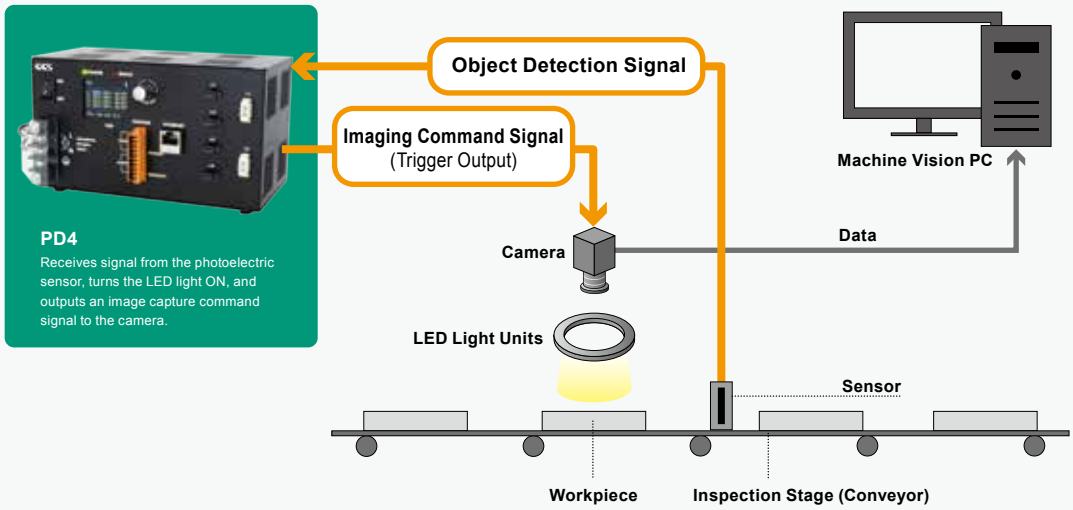


Trigger Output Mode

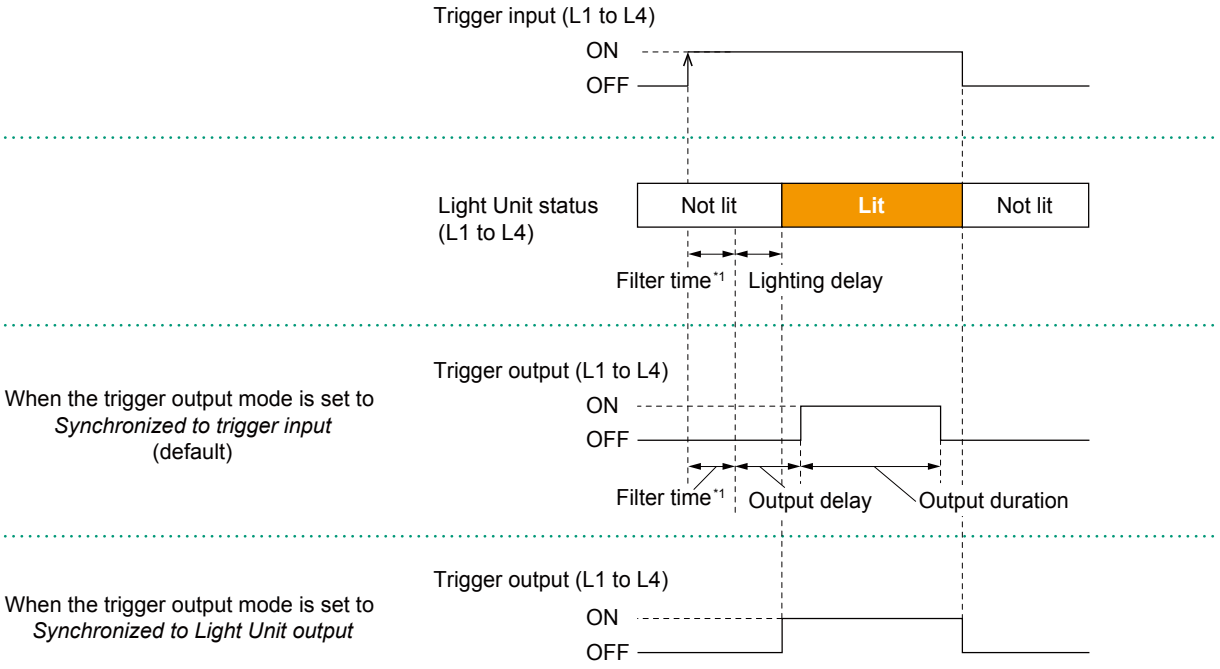
▷ Trigger signal can be output from the control unit

Sends an output trigger signal to the camera so the timing of the light and camera can be synchronized.

■ Trigger Output Application Example



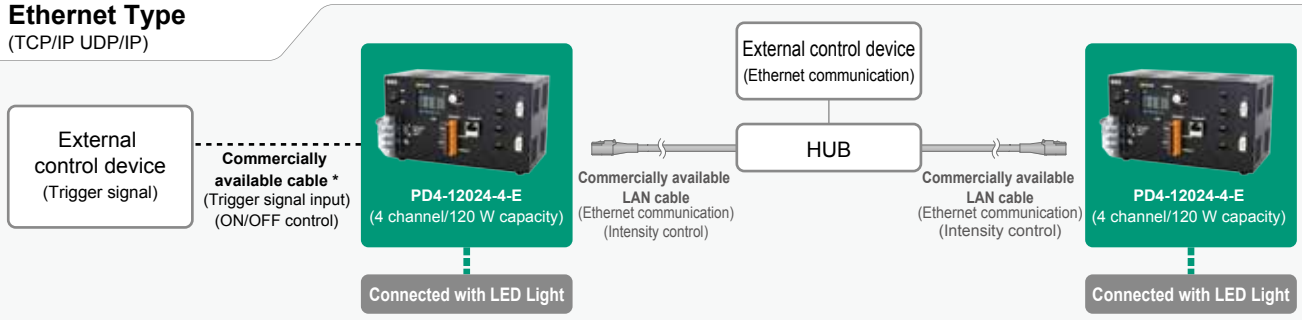
■ Trigger Output Signal Connection Example



*1 Filter time can be set when noise is mixed in with the signal input from the trigger pin.

Example System Configuration

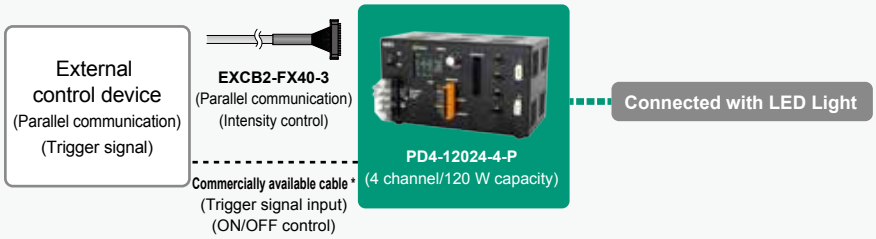
Ethernet Type
(TCP/IP UDP/IP)



* AWG26 to 16 (0.13 to 1.31 mm²) Refer to the instruction manual for details.

Trigger input is required for ON / OFF mode and strobe mode.

Parallel Type



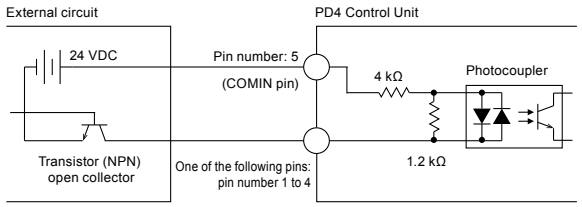
* AWG26 to 16 (0.13 to 1.31 mm²) Refer to the instruction manual for details.

Trigger input is required for ON / OFF mode and strobe mode.

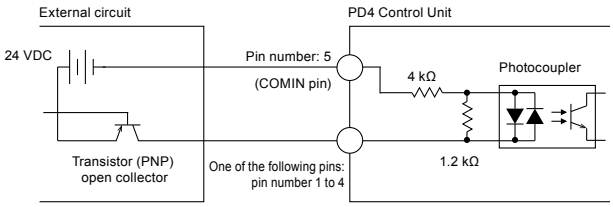
External Signal Connection Example (Supports Both PNP / NPN Connections)

External Trigger Input Signal Connection Example

Sinking (NPN)



Sourcing (PNP)

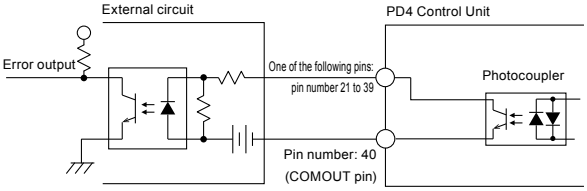


Connection Specifications (Per 1 Terminal)				
Rated input voltage	**Maximum input voltage**	**Photocoupler ON voltage / ON current**	**Photocoupler OFF voltage / OFF current**	**Response time**
24 VDC±10%	26.4 VDC	21.6 VDC min. / 3 mA min.	1.5 VDC max. / 1 mA max.	Refer to the sequence diagrams.

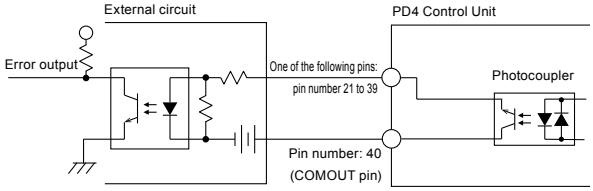
Set Values	Photocoupler	When in ON/OFF Mode	When in Strobe Mode
ACTIVE HI (default)	OFF	Light Unit OFF	When the photocoupler switches from OFF to ON, the light comes on with the specified ON time
	ON	Light Unit ON	
ACTIVE LO	OFF	Light Unit ON	When the photocoupler switches from ON to OFF, the light comes on with the specified ON time
	ON	Light Unit OFF	

External Signal Connection Example (Parallel Type)

Sinking (NPN)



Sourcing (PNP)



Connection specifications				
Rated input voltage	**Maximum input voltage**	**Photocoupler ON voltage / ON current**	**Photocoupler OFF voltage / OFF current**	**Response time**
24 VDC±10%	26.4 VDC	21.6 VDC min. / 1.4 mA min.	1.5 VDC max. / 0.05 mA max.	Refer to the sequence diagrams.

Set Values	Photocoupler	Data	Signal input through the write pin
ACTIVE HI (default)	OFF	0	OFF
	ON	1	ON
ACTIVE LO	OFF	1	ON
	ON	0	OFF

Specifications by Model

PD4-6024 Series

Model name *1	PD4-6024-4-E (-NC)	PD4-6024-4-P (-NC)	PD4-6024-2-E (-NC)	PD4-6024-2-P (-NC)
Applicable Light Units (rating)	24V DC Light Units, total for all connectors: 60 W max. (SMP-03V-BC: 60 W max. per connector)			
Number of channels	4	4	2	2
External control method	Ethernet comm., PLCCOM comm	Parallel control	Ethernet comm., PLCCOM comm	Parallel control
Power consumption (max.)	152 VA	155 VA	152 VA	155 VA
Inrush current *2 (typ.)	27 A (at 100 VAC), 63 A (at 240 VAC) from a cold start			

PD4-12024 Series

Model name *1	PD4-12024-4-E (-NC)	PD4-12024-4-P (-NC)	PD4-12024-2-E (-NC)	PD4-12024-2-P (-NC)
Applicable Light Units (rating)	24V DC Light Units, total for all connectors: 120 W max. (ELR-02V: 120 W max. per connector, SMP-03V-BC: 60 W max. per connector) * When using EL connector: L1 (CH1) and L2 (CH2)			
Number of channels	4	4	2	2
External control method	Ethernet comm., PLCCOM comm	Parallel control	Ethernet comm., PLCCOM comm	Parallel control
Power consumption (max.)	168 VA	170 VA	168 VA	170 VA
Inrush current *2 (typ.)	14 A (at 100 VAC), 34 A (at 240 VAC) from a cold start			

Common Specifications

Product name	Control Units for LED Light Units
Lighting method	Strobe lighting, continuous lighting (no overdrive)
Drive method	Constant-voltage system
Intensity control method	PWM control
PWM frequency	125 kHz
Input power	Single-phase 100 to 240 VAC (±10%), 50/60 Hz
Overvoltage category	Category II
Operating environment	Temperature: 0 to 40°C, Humidity: 20% to 85% (with no condensation) Altitude: 2,000 m max., protective ground class: class I, pollution degree: 2, indoor use only
Storage environment	Temperature: -20 to 60°C, Humidity: 20% to 85% (with no condensation)
Cooling method	Natural air cooling
Environmental regulations	RoHS, TSCA PBT
Compatible standards	CE, UKCA
Material, coating, and surface processing	Steel sheet, cover thickness: 1.6 mm, chassis thickness: 1.0 mm, black (leather satin)
Weight	1.5 kg max.
Accessories	One hardware manual, one Power Terminal Block Cover, two M4 screws for the cover, one 2-m-long 3-prong AC power cable with ground terminal *1, one Trigger Terminal Block *3

*1 AC power cable will not be included in the model with "-NC" at the end. E.g. PD4-6024-4-E-NC.
AC power cables included in models without "-NC" are not dedicated for the use in Europe or Korea.
For European and Korean customers, please select models with "-NC" (e.g. PD4-6024-4-E-NC) which don't have AC power cables as an accessory.

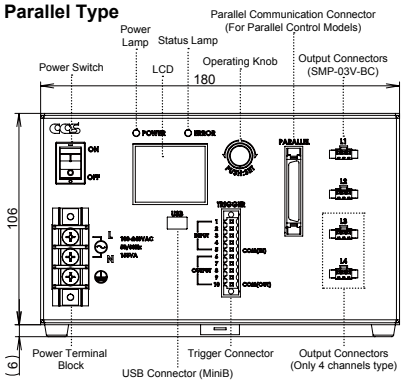
*2 When selecting a circuit breaker, refer to this value and select the product that has the trip characteristics suitable for use with switched mode power supplies.
For information on the applicable trip characteristics, refer to the switched mode power supply manufacturer websites, etc.

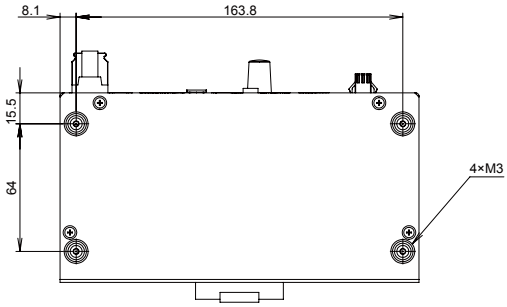
*3 Power cables are not included, so please prepare separately.
Applicable Power Cables: AWG 26 to 16 (0.13 to 1.31 mm^2), Length: within 3 m, Bare End: 8 mm (Ferrule can be used)

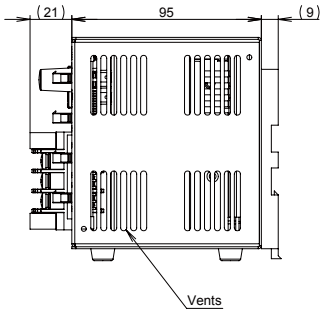
Dimensions (mm)

PD4-6024-4-E (-NC) / PD4-6024-4-P (-NC) / PD4-6024-2-E (-NC) / PD4-6024-2-P (-NC)

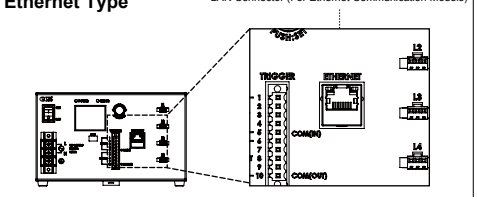
Parallel Type





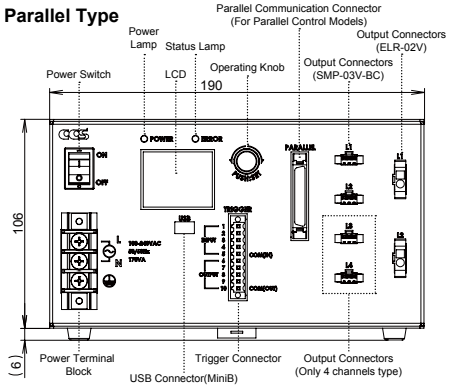


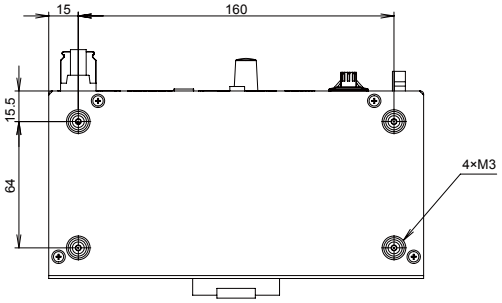
Ethernet Type

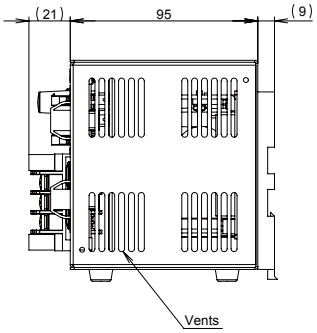


PD4-12024-4-E (-NC) / PD4-12024-4-P (-NC) / PD4-12024-2-E (-NC) / PD4-12024-2-P (-NC)

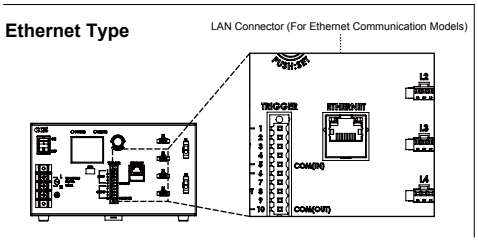
Parallel Type







Ethernet Type



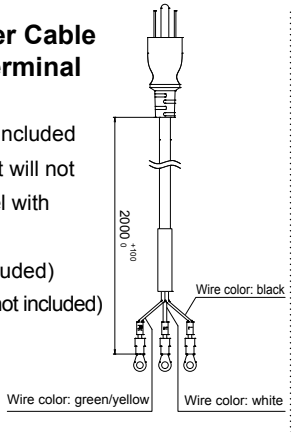
Optional Accessories

Prong AC Power Cable with Ground Terminal

(100-120VAC, 2m)

AC power cable will be included in the standard model. It will not be included in the model with "-NC" at the end.

E.g. PD4-6024-4-E (included)
PD4-6024-4-E-NC (not included)

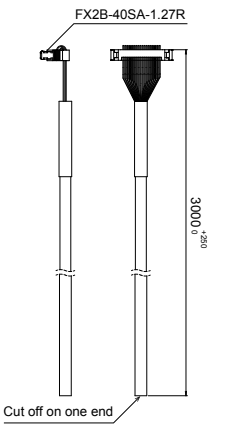


ACC-JIS-125-7-M4-2

Parallel Communication Cable (Sold Separately)

Parallel communication cable

PIN No	Line color	Marking	PIN No	Line color	Marking	PIN No	Line color	Marking	PIN No	Line color	Marking
1	Orange	Red 1	11	Orange	Red 2	21	Orange	Red 3	31	Orange	Red 4
2	Orange	Black 1	12	Orange	Black 2	22	Orange	Black 3	32	Orange	Black 4
3	Gray	Red 1	13	Gray	Red 2	23	Gray	Red 3	33	Gray	Red 4
4	Gray	Black 1	14	Gray	Black 2	24	Gray	Black 3	34	Gray	Black 4
5	White	Red 1	15	White	Red 2	25	White	Red 3	35	White	Red 4
6	White	Black 1	16	White	Black 2	26	White	Black 3	36	White	Black 4
7	Yellow	Red 1	17	Yellow	Red 2	27	Yellow	Red 3	37	Yellow	Red 4
8	Yellow	Black 1	18	Yellow	Black 2	28	Yellow	Black 3	38	Yellow	Black 4
9	Pink	Red 1	19	Pink	Red 2	29	Pink	Red 3	39	Pink	Red 4
10	Pink	Black 1	20	Pink	Black 2	30	Pink	Black 3	40	Pink	Black 4

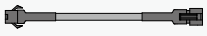


Model name: EXCB2-FX40-3

Can be connected to the HLV3 Series by using a control unit adapter

Spot Lighting
HLV3-22-4M/4S/4C Series emission colors (red, white, blue, green), HLV3-22IR860 (infrared)

Straight Cable
FCB-1/-2/-3/-5



Robot Cable
FRCB-1/-2/-3/-5

* Branch cables cannot be used.

Custom order

Power Adapter

PD4 Series

Light and power adapter compatibility table (example)

Light Model Name	Emitting color					Power adapter model name (Custom order)
HLV3-14	RD	SW	BL	GR	—	**Model name: RB-82-24-15SP** Quantity of light: 0.9X, Power consumption: 7.3 W *1
HLV3-22-1 / -1C	RD	SW	BL	GR	—	**Model name: RB-56-24** Quantity of light: 0.8X, Power consumption: 11 W *1
HLV3-22-2 / -2C	RD	SW	BL	GR	—	**Model name: RB-56-24** Quantity of light: 0.8X, Power consumption: 18 W *1
HLV3-22-4S / 4M /-4C **HLV3-22-NR-4** **HLV3-22IR860**	RD	SW	BL	GR	IR	**Model name: RB-56-24** Quantity of light: 0.7X, Power consumption: 25 W *1

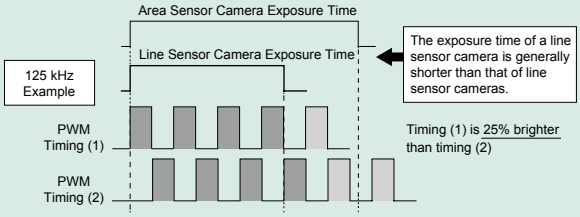
*1 Power consumption is the total value of the applicable light and power adapter. Note) Quantity of light will be lower than when using the PJ Series control unit dedicated for spot lights.

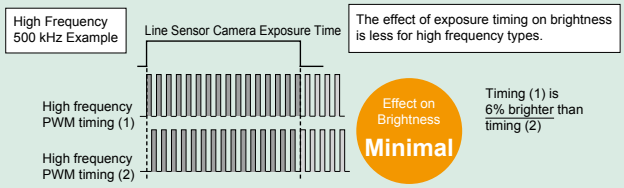
Lineup of Models with 500 kHz PWM Frequency <Custom Order Products>

When selecting a digital power supply, consider using the higher frequency type. Power supplies with a PWM frequency of 500 kHz can be made to order. Contact our local sales office for details.

●Effect of PWM Frequency versus Brightness

(Conceptual image)





For more information about the product
Please refer to the hardware manual and operation manual.
< Downloadable from the web page > https://www.ccs-grp.com/products/series/371

Notes

- To ensure proper and safe use of the product, please read the Instruction Guide completely before using the product.
- The design and specifications of this product are subject to change without notification for product improvement.

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