



CE



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

- Connect 24V DC Light Units and Spotlights. Use up to 4 channels.
- The light intensity can be manually controlled with a switch on the front panel, or externally controlled using Ethernet.
- Use PWM control to control the 24V DC Light Unit output at a frequency of 125 kHz.
- TCP/IP and UDP/IP Ethernet communications can be used for external control.
- Use external trigger inputs to turn Light Units ON and OFF, or to flash the strobe (for 24V DC Light Units only).

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.

	Indicates that incorrect usage may result in serious injury or death.	Caution	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.



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.	T SUBJECT IOISTURE	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 cord. Not doing so may result in fire or electric shock.					

CCS	PD3-5024-4-EI
CH SEL L1 L2 L3 L4	HLV LIGHT L3 L4
EXTERNAL	24V LIGHT L3 L4
	68 FG
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	A c	aution	
Do not connect any Light Units other than CCS LED Light Units. Doing so may cause overcurrent and the device may overheat or ignite.	PROHIBITED	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.	INSTRUCTED
Do not use user-made light cables. Doing so may cause product failure.		Plug the power cord directly into a wall socket. Using a power strip or connecting many loads from one electrical outlet may cause fire or electric shock.	INSTRUCTED
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.	INSTRUCTED
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.	INSTRUCTED
Do not bend cables or jam them between objects when wiring. Doing so may cause product failure.	PROHIBITED	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.	INSTRUCTED
Do not intentionally short-circuit the positive and negative output terminals.	PROHIBITED	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.	INSTRUCTED
Do not wipe the product with volatiles such as paint thinner or benzene. Discoloration or deterioration of the product surfaces may occur.	PROHIBITED	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.	INSTRUCTED	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.	INSTRUCTED

Names and Functions of Parts

Setting Indicators

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

Channel Selection Switch

Select a Light Unit that is connected to an output connector from between L1 and L4. L1 for the 24V Light Units (24V LIGHT) and L1 for the Spotlights (HLV LIGHT) use the same channel.

Channel Indicators

The indicator for the selected channel will light. When the L1 indicator is lit, the settings for the L1 Light Unit in the 24V Light Units (24V LIGHT) and the L1 Light Unit in the Spotlights (HLV LIGHT) can be changed.

External Control Reset Switch

Pressed with a pointed object to reset all settings to their default values.

External Control Connector

Used for external control with Ethernet communications.

Manual/External Mode Selector

Trigger Logic Switch

Selects the logic of the trigger signal.

Fan Air Inlet (Left side)

This is the air inlet for the cooling fan.

AC Inlet

Connects the power source to the Control Unit.

External Trigger Input Connector

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

Digital Window

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

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.



3 Installation



Do not place any objects within 20mm from the fan air inlets or fan exhaust outlets. Insufficient ventilation may cause heat to accumulate inside the product and result in a fire.

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 (Accessories)

Always use Base Brackets (model: BK-PD3) when securing the Unit at \rm Caution 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.





If other screws are used, they may short-circuit internal components and electric shock may occur.



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.

Application Guide

Lig	Control Mode	Front panel op	eration		External control us or image process of	sing a PLC device
Continuous Mode	The Light Units are always ON. Power ON Power OFF Not lit Lit.	To use manual control in Continuous Mod items 1, 2, and 3 under 7 Manual	e, refer to Control	To use external cont refer to items 1 8 Control with	trol in Continuous Mode, , 2 , and 3 under External Signals	LAN cable
ON/OFF Mode	The Light Units are turned ON or OFF according to the external trigger signal input. Photocoupler OFF Photocoupler ON *Wen the Trigger Ligts Not lit. Lit. Not lit. * It is possible to turn LED light unit ON and OFF by Ethernet communications, too.	To use manual control in ON/OFF Mode, refer to items 1, 2, and 3 under 7 Manual Control and 9 Inputting the External Trigger.	External Trigger Input Cable (EXCB2-M10-3)	External trigger sign communications set using ON/OFF mod To use external trigg refer to items 1 8 Control with Ext 9 Inputting the E To use Ethemet commun refer to items 1 8 Control with Ext	aal or Ethernet tting can be selected when e by external control. ger signal in ON/OFF mode, 2 , and 3 under kternal Signals and xternal Trigger . ications setting in ON/OFF mode, 2 , 3 , and 5 under ernal Signals .	LAN cable (EXCE2-M10-3)
Strobe Mode	The Light Units are turned ON for a set time after the external trigger signal is input. Photocoupler OFF Photocoupler ON * When the Togen Lopic Switch is set to HIGH Not lit. Lit. Not lit.	To use manual control in Strobe Mode, refer to items 1 , 2 , 3 and 4 under 7 Manual Control and 9 Inputting the External Trigger (Only 24V DC Light Units can be set.)	External Trigger Input Cable (EXCB2-M10-3)	To use external c refer to items 1, 8 Control with 9 Inputting the (Only 24V DC Ligh	control in Strobe Mode, 2 , 3 , and 4 under External Signals and External Trigger nt Units can be set.)	LAN cable External Trigger Input Cable (EXCB2-MIR-5)

6 Light Unit Functions

This Control Unit can be connected to Light Units and Spotlights with 24V DC inputs. Connect 24V DC Light Units to the 24V LIGHT connectors and Spotlights to HLV LIGHT connectors. The functions vary with the Light Units that are connected. Check the following table before using the Light Units.



Item		24V LIGHT	HLV LIGHT	Reference page
Applicable illuminators		Light Units with 24V DC input voltage	Spotlights: HLV2 series, HLV series* *not including HLV-27 series/HLV-14-R/ HLV-14-GR/HLV-14-BL/HLV-14-SW	10
Lighting method		PWM control or lighting time control	Variable current control	10
Lighting mode	Continuous mode	0	0	5, 6
	ON/OFF mode	0	0	5, 6
	Strobe mode	0		5, 6
Control mode	Manual control	0	0	5
	External control	0	0	6, 7
Rated capa	city	46W max.	Per connector: 3.9 W max. (700mA max.)	10
Lighting de	lay time	Depends on the power consumption of the Light Units.	Depends on the light intensity of the Light Unit.	8
Channel se	lection	Depends on which Light Units are connected/disconnected.	Only connected Light Units can be selected.	5
Light Unit con	nection detection	Detected when connected for the first time.	Detected at any time.	5
Power start	tup time	0.5 s	3 s	10

4

7 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.





2 Selecting the Channel

Press the channel selection switch to select the channel to set (L1 to L4). Only channels with Light Units connected to them can be selected. (If a new Light Unit is connected, the lowest channel is automatically selected.)

Four channels from L1 to L4 are allocated to the 24V LIGHT and HLV LIGHT output connectors. When L1 is selected, settings for the L1 Light Unit for the 24V LIGHT connectors and the HLV LIGHT connectors can be changed. The 4 channels can be controlled separately.



Precautions for Channel Selection

Only channels with Light Units connected to them can be selected. If a Light Unit is removed without turning OFF the power supply, the channel for the Light Unit that is no longer connected may be selected. This does not indicate a malfunction. Check the following table for details. There is risk of fire or electric shock. Make sure that the power supply is turned OFF when you connect Light Units or Spotlights.

Operation	24V LIGHT	HLV LIGHT
The Light Unit was disconnected without turning OFF the power supply.	The channel with the disconnected Light Unit can be selected.	The channel with the disconnected Light Unit cannot be selected.
A Light Unit that is not supported was connected.	If there is an electrical connection, the Light Unit will light. (The channel can be selected.)	The Light Unit does not turn ON or an HLV ID error occurs. (The channel cannot be selected.)
Connector Connecti	on Example	
Channels L2 and L4 can be selected for the following connections: HLV LIGHT : L4 and 24V LIGHT : L2 .	CH SEL	
Channels L1, L2 and I can be selected if the connecti are changed to the followi HLV LIGHT : L3 and 24V LIGHT : L1. without turning OFF the power sup	3 ons CH SEL Even if the Light Unit is disconnecter the power is turned OFF. (The settings are also retained.	

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: 2000, Maximum: 255) BRT OF Press. PLS O LOCK O

Digital Window	Light intensity (%)				
Digital Willow	24V LIGHT	HLV LIGHT			
000 📶	0.4 (Dimly lit)	0.0 (Not lit)			
001 📶	0.8	0.4			
002 📶	1.2	0.8			
:	:	:			
254 254	99.6	99.6			
255 255	100.0	100.0			

* The light intensities are theoretical values.

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**)



4 Selecting the Lighting Mode (Continued)

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 μ s 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. The Strobe Mode can be set for 24V DC Light Units only.

Digital Window	Status		
F00 <u>F00</u>	Continuous Mode	e / ON/OFF Mode	
F01 <u>F[]</u>	Strobe Mode (The Strobe Mode can be set for 24V DC Light Units only.)	40µs	
F02 <u>F02</u>		80µs	
F03 <u>F[]</u>		120µs	
F04 <u>F04</u>		200µs	
F05 <u>F05</u>		600µs	
F06 <u>F06</u>		1ms	
F07 <u>F07</u>		4ms	
F08 <u>F08</u>		10ms	
F09 <u>F09</u>		20ms	
F10 <i>F [</i>]		40ms	

For details on the external trigger input, refer to 9. 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.



8 Control with External Signals

Specifications for External Control

Sample of Alphanumeric Characters: ABCDEFGHIJKLMNOPQRSTUVWXYZ 0123456789

Communications Specifications (*1)

F	Protocol layer	TCP/UDP protocol	IPv4 protocol		Ethernet	
	Specification	Standard	Standard	Standard	Baud rate	Transmission medium
	Specification	RFC793, RFC768	RFC791	IEEE802.3, IEEE 802.3u, IEEE 802.3x	10 Mbps/100 Mbps (Automatically detected.)	10BASE-T, 100BASE-TX

Command Formats

Send Data (*2)								
Function	Hoador	Channel an addition		Sent command	Chocksum	Dolimitor	Default	
Function	Treater	Channel Specification	Instruction	Data (*3)	Checksum	Demme	Delaun	
Light Intensity Setting		00 to 03	F	000 to 255 (Refer to *5)			000	
Lighting Mode Setting		(Refer to *4)	s	00 to 10 (Refer to *6)			00	
ON/OFF Setting]	FF: All channels	L	0: Not lit, 1: Lit (Refer to *7)		<cr><lf></lf></cr>	(Refer to *9)	
Setting Status Check		(ON/OFF setting only).	М		00 to FF (Refer to *8)			
Error Status Check			С					
All Channel Initialization			R					
IP Address			E01				192.168.000.002	
Subnet Mask		00 (fixed)	E02	(Specify all digits, e.g., specify			255.255.255.000	
Default Gateway]	00 (IIXed)	E03	"192.168.000.005" instead of "192.168.0.5.")			192.168.000.001	
Reply IP Address			E05				192.168.000.016	
Reception Port Setting]		E04	00000 to 65535 (Specify all digits a g. specify "04561"			40001	
Reply Port Setting]		E06	instead of "4561.")			30001	

Receive Data (*10)

Function	Hoodor	Channel energification		Received command			Chocksum	Dolimitor																			
Function	Treater	Channel Specification	ОК		NG		Checksum	Demme																			
Light Intensity Setting		00 to 03																									
Lighting Mode Setting		(Refer to *4) FF: All channels (ON/OFF setting only).																									
ON/OFF Setting																											
Setting Status Check]		(ON/OFF setting only).	(ON/OFF setting only).	(ON/OFF setting only).		F999.S99.L9 (Refer to *11)																				
Error Status Check	1		10 (51)	00 (5	0 (fired)		00: Normal, 11: Error																				
All Channel Initialization																							0	N	01: Command error	00 to FF	
IP Address	e e					0	IN	03: Set value out of range error	(Refer to *8)	SUN-SLF-																	
Subnet Mask	1					00 (fixed)	00 (five d)	00 (fixed)	00 ([[]])	00 (fined)	00 (Since d)	00 (5110-1)	00 (Streed)	00 (fired)													
Default Gateway	1																										
Reply IP Address	1																										
Reception Port Setting]																										
Reply Port Setting	1																										

<< Annotation>>

*1) The number of TCP connection (possible numbers to connect at same time) which PD3 correspond is "1"

*2) Send a data within 4 seconds from 'Header' to 'Delimiter', otherwise time-out error occurs and command data will be rejected.

*3) Specify all numbers in decimal format.

., .,																
*4) Channel Specification	Four channels 24V LIGHT cor	from L1 to nectors ar	L4 ar nd the	e allocat HLV LIC	ed to GHT co	the 24 onnecto	/ LIGHT ors can b	and HL e chang	V LIGI Ied. Th	HT out ne 4 ch	tput con nannels	nnectors. W s can be co	/hen L1 ntrolled s	is selecte separatel	ed, settir ly.	ngs for the L1 Light Unit for the
	Channel	L1	L2	L3	L	_4										
	Set value	00	01	02	()3 (5	Set value	s that a	re higl	her tha	an 03 a	re not valid	.)			
*5) Light Intensity Settings	The light inten	sity is conf	rolled	l to any o	of 256	levels.	000 to 2	55 (00	D: Min	imum,	255: N	/laximum)				
	Light intensity	24V LIG	HT 0	.4 (Diml	y lit)	0.8	1.2	• • •	99	0.6 1	100.0					
	(%)	HLV LIG	ILV LIGHT 0.0 (Not		t lit) 0.4		0.8		99).6 1	100.0					
	Digital v	vindow		000		00 I	002	•••	29	54	255					
	Set v	alue		000		001	002	•••	25	54	255	* The light	intensiti	es are th	eoretica	l values.
*6) Lighting Mode Settings	Select the light (The Strobe M	ting mode lode can b	form (be set	Continuo for 24V	ous M DC Li	ode, O ght Uni	N/OFF N ts only.)	lode, o For det	· Strob ails or	be Moo the e	de. The xternal	e lighting tir I trigger inp	me can b out, refer	e set in to 9. Inp	Strobe I outting th	Mode. ne External Trigger.
	Status	Continuous M			Strobe Mode											
		or ON	OFF I	Mode	40µ:	s 80	us 120	µs 20	0µs (600µs	i 1ms	s 4ms	10ms	20ms	40ms	
	Digital windo	w	FOO		F0 .	l ED	2 EO	3 E	<u> </u>	FOS	FDE	FD7	FOB	F09	FID	(Set values that are higher
	Set value		00		01	0:	2 03	3 (4	05	06	07	08	09	10	than 10 are not valid.)
	Continuou Set the valu Normal Mode Unit lit continu	tinuous Mode he value to 00 to enter al Mode and keep the Light t continuously.			ON/OFF Mode Strobe Mode (If the external trigger is not used, the Light Units are 0N continuously.) (If an external trigger is not used, the Light Units are OFF.) Set the value to 00 to enter ON/OFF Mode and turn the Light Units are tormed ON or DFF according to the external trigger signal input. Select the lighting time from 01 to 10 (40 µs to 40 ms) to The Light Units are turned ON or The Light Units are turned ON or Select the lighting time from 01 to 10 (40 µs to 40 ms) to Select the light Units are turned ON or The Light Units are turned ON or The Light Units are turned ON or Select the light Units are turned ON or The Light Units are turned ON or The Light Units are turned ON or Select the light Units are turned ON or the set for 24V DC						nits are OFF.) us to 40 ms) to use a strobe light. et time after the external trigger set for 24V DC Light Units only.					

ON/OFF setting from Ethernet communications and trigger signal input at same time in ON/OFF mode. When Trigger logic switch is at HIGH: if ether controls setting to OFF setting, Light unit will be to When Trigger logic switch is at LOW: if ether controls setting to ON setting, Light unit will be to When Trigger logic switch is at LOW: if ether controls setting to ON setting, Light unit will be to the send command are added, the lowest byte is converted to hexadecimal, and two characters are sent. (*) The lowest byte (two characters) of 17F) Default setting for trigger logic switch is HIGH =11(ON) and LOW =0(OFF):) There is no received data when timeout error occurs.) Received command for setting status check (F999.S99.L9) F999=Light intensity setting (F000 to the formation of the external Mode Selector to External Mode. e Manual/External Mode Selector to Extransl ng the Manual/External Mode Selector to Extransl Mode. The value set with evup it is possible to set the external mode. ng Up the Network (Only Initially and When Settings Are Changed) e Unit's IP address and the reply address. To enable the settings that were changed. It address and the reply address. 10 @00E03192.168.003.00133CRLF Sutting example Setting example is the channel and set the light intensity. is the setting for trigger logic switch is set to address. Proceedures sure that the main power source is turned ON. e Manual/External Mode Selector t	ti '0' and C Imed ON tensity of 0 30 h 2555), S99 Set items Set items Set items Cycle the	DN at '1'. OI	I/OFF setting w to 125 3 Byte 4 F x 46 hex 1/OFF setting w 3 , and 5 w 3 , and 5 w 3 , and 4 w played on the ting will not be pply. ive data when	Vhen using vhen using ook	eld after turn mmand Byte 6 2 32 hex L9=ON/OFI g Strobe N ntil the R (when	Byte 7 5 35 hex F setting (L F Mode. Mode. Mode.	Total 17F hex .0: Not lit / L ² .0: Not lit / L ² a when NG 4FCRLF command e 51CRLF
When prigger logic switch is at HIGH: if ether controls setting to OFF setting. Light unit will be to When Trigger logic switch is at LOW: if ether controls setting to OFF setting. Light unit will be to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command are added, the lowest byte is converted to heread command for setting status check (F999.S99.L9) F999=Light intensity setting (F000 to heread command for setting status check (F999.S99.L9) F999=Light intensity setting (F000 to use that the main power source is turned ON. Procedures get the Manual/External Mode Selector to External e Manual/External Mode Selector to EXT to set External Mode. The value set with evaluatertamal mode selector is set to advertamal mode selector is set to advertamal mode. ng Up the Network (Only initially and When Settings Are Changed) e Unit's IP address and the reply address. To enable the settings that were changed IP address danges, do not forget to change the send destination of commands. IP Address 192.168.3.1	irred OFF ned ON tensity of r Byte 0 x 30 he 255), S99 Set items Set items Set items cycle the Cycle the	Channel 2 Channel 2 Channel 2 Channel 2 1 ax 31 ha D=Lighting n D=Lighting n 1, 2, 1 1, 2, 1 1, 2, 1 ntrol is dis sode, the set Rece	to 125 3 Byte 4 F x 46 hex ode setting (SC 3 , and 5 v 3 , and 4 v played on the ting will not be pply. ive data when	Sent cor Byte 5 1 31 hex 00 to S10), h when using when using when using when using other using other using	mmand Byte 6 2 32 hex L9=ON/OFI g ON/OFF g Strobe N indow. ntil the Ref (when 1	Byte 7 5 35 hex F setting (L F Mode. Mode. Mode.	Total 17F hex .0: Not lit / L ² .0: Not lit / L ² a when NG 4FCRLF command e 51CRLF
Checksum Example: Setting the Light in the send command are added, the lowest byte is converted to bewadecimal, and two characters are sent. <pre></pre>	tensity of r I Byte 0 0 x 30 ha c cycle the	Charmel 2 Byte 2 Byte 1 1 ex 31 hr ==Lighting n 1 ==1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1	to 125 3 Byte 4 F x 46 hex add bex add bex	Sent cor Byte 5 1 31 hex 00 to S10), I 00 to S10, I 00 to S	mmand Byte 6 2 32 hex L9=ON/OFF g ON/OFF g Strobe M indow. ntil the R((when 1)	Byte 7 5 35 hex F setting (L Mode. Aode.	Total 17F hex .0: Not lit / L ² .0: Not lit / L ² a when NG 4FCRLF command e 51CRLF
The codes of the ASCII characters from the header to the send command are added, the lowest byte is converted to hexadecimal, and two characters are sent. <pre></pre>	r 0 Byte 0 x 30 he 255), S99 Set items Set items Set items cycle the	Channel 2 Byte 1 ex 31 h ex 32 h ex 34	3 Byte 4 F x 46 hex ode setting (S0 3 , and 5 v 3 , and 4 v played on the ting will not be pply. ive data when	Sent cor Byte 5 1 31 hex 00 to S10), I 00 to S10), I when using when using when using when using OK	mmand Byte 6 2 32 hex L9=ON/OFI g ON/OFF g Strobe M indow. ntil the R((when 1)	Byte 7 5 35 hex F setting (L Mode. Mode. dode.	Total 17F hex .0: Not lit / L .0: Not lit / L a when NG 4FCRLF command e 51CRLF
Build collination and two characters are sent. Extractor and the characters. Extractor and the character and the characters. Extractor and the character and the character and the character and the character a	Set items Cycle the Cycle the	2 Byte 1 1 ex 31 hr =Lighting n =1, 2, 1 1, 2, 1 </td <td>3 Byte 4 F F x 46 hex iode setting (S0 3 , and 5 y 3 , and 5 y 3 , and 4 y played on the ting will not be pply. ive data when pooeEFCRLF</td> <td>Byte 5 1 31 hex 00 to S10), I when using whe</td> <td>Byte 6 2 32 hex 4 L9=ON/OFI g ON/OFF g Strobe M indow. ntil the</td> <td>Byte 7 5 35 hex F setting (L Mode. //ode. //ode. //ode. //ode. //ode.</td> <td>17F hex 17F hex 0: Not lit / L 0: Not lit / L 0: MO 17F hex 0: Not lit / L</td>	3 Byte 4 F F x 46 hex iode setting (S0 3 , and 5 y 3 , and 5 y 3 , and 4 y played on the ting will not be pply. ive data when pooeEFCRLF	Byte 5 1 31 hex 00 to S10), I when using whe	Byte 6 2 32 hex 4 L9=ON/OFI g ON/OFF g Strobe M indow. ntil the	Byte 7 5 35 hex F setting (L Mode. //ode. //ode. //ode. //ode. //ode.	17F hex 17F hex 0: Not lit / L 0: Not lit / L 0: MO 17F hex 0: Not lit / L
(* The lowest byte (lwo characters) of 17F is taken, so the checksum is 7F. ASCII (hexadecimal) 40 hr Default setting for trigger logic switch is HIGH ='1(ON)' and LOW ='0(OFF)'. Image: trigger logic switch is HIGH ='1(ON)' and LOW ='0(OFF)'. (*) There is no received data when timeout error occurs. Image: trigger logic switch is HIGH ='1(ON)' and LOW ='0(OFF)'. (*) There is no received data when timeout error occurs. Image: trigger logic switch is HIGH ='1(ON)' and LOW ='0(OFF)'. (*) There is no received data when timeout error occurs. Image: trigger logic switch is thread to compare the set logic trigger logic switch is HIGH ='1(ON)' and LOW ='0(OFF)'. (*) There is no received data when timeout error occurs. Image: trigger logic switch is HIGH ='1(ON)' and LOW ='0(OFF)'. (*) There is no received data when timeout error occurs. Image: trigger logic switch is HIGH ='1(ON)' and LOW ='0(OFF)'. (*) There is no received data when timeout error occurs. Image: trigger logic switch is the set trigger logic switch is set to switch and set the external control setting even the manual/external mode selector is set to external mode. (*) Up the Network (Only Initially and When Settings Are Changed) Image: trigger logic switch is and external control setting even the settings that were changed IP address changes, do not forget to change the send destination of commands. (*) Up the Network (Only Initially and When Settings Case Set Set Set Set Set Set Set Set Set Se	0 x 30 hd 2255), S99 Set items Set items cycle the cycle the	1 ex 31 he =Lighting n =Lighting n 1, 2, 1 1, 2, 1 1, 2, 1 ntrol is dis ode, the se	F x 46 hex add setting (SC 3 , and 5 v 3 , and 4 v played on the played	1 31 hex 00 to \$10), I when using when using when using of the	2 32 hex L9=ON/OFI g Strobe N indow. ntil the R (when	5 35 hex F setting (L F Mode. Mode. Mode.	17F hex .0: Not lit / L: .0: Not lit / L: .0: MO .0: MO
Default setting for trigger logic switch is HIGH = 1(ON)' and LOW = 0(OFF)'. 1) There is no received data when timeout error occurs.) Received command for setting status check (F999.S99.L9) F999=Light intensity setting (F000 to Procedures sure that the main power source is turned ON. ms 1, 2, and 3 when using Continuous Mode. e Manual/External Mode Selector to External e Manual/External Mode Selector to Extremal Mode. The value set with every is possible to set the external control setting even the manual/external mode selector is set to external mode. ng Up the Network (Only Initially and When Settings Are Changed) e Unit's IP address and the reply address. To enable the settings that were changed IP address changes, do not forget to change the send destination of commands. IP Address 192.168.3.2 @00E001192.168.003.00302GRLF Subnet Mask 255.255.25.00035CRLF Default Gateway 192.168.3.1 @00E004456149CRLF Reply IP Address 192.168.3.10 @00E06045624CCRLF ng the Light Intensity Setting Setting fy the channel and set the light intensity. Setting Setting y the channel and set the lighting mode. Setting Setting y the channel and set the lighting mode. Setting Setting	Set items Set items Cycle the	=Lighting n 1, 2, 1 1, 2, 1 1, 2, 1 1, 2, 1 ntrol is dis is dis ode, the set a power su Rece	and setting (S(3), and 5) v 3), and 4) v played on the ting will not be pply. ive data when	00 to \$10), I vhen using vhen using e digital wi activated u	L9=ON/OFI g ON/OFF g Strobe M indow. ntil the R (when	F setting (L F Mode. Aode. dode. eceive dat @00N014 there is a 0 @00N031	a when NG
a) There is no received data when timeout error occurs. A) Received command for setting status check (F999.S99.L9) F999=Light intensity setting (F000 to Procedures sure that the main power source is turned ON. ms 1, 2, and 3 when using Continuous Mode. and the Manual/External Mode Selector to External e Manual/External Mode Selector to EXT to set External Mode. The value set with exually it is possible to set the external control setting even the manual/external mode selector is set to usalexternal mode selector is set to external mode. mg Up the Network (Only Initially and When Settings Are Changed) e Unit's IP address and the reply address. To enable the settings that were changed IP address changes, do not forget to change the send destination of commands. https://www.ip2.168.3.2 @00E01192.168.003.00230CRLF Subnet Mask 255.255.255.0 @00E02352.255.255.0 @00E023192.168.003.00131CRLF Exept Port Setting 4561 @00E040456149CRLF Reply IP Address 192.168.3.10 @00E060456149CRLF Reply Port Setting 4562 @00E06045624CCRLF fy the channel and set the light intensity. setting the Light Intensity // we channel and set the light intensity.// we channel and set the light intensity.// we channel // we channel and set the light intensity. 	Set items Set items Cycle the	 Elighting n 1, 2, 1 1, 2, 1<td>ode setting (SC 3, and 5 v 3, and 4 v played on the ting will not be pply. ive data when</td><td>00 to S10), I when using when using e digital wi activated u</td><td>L9=ON/OFI g ON/OFF g Strobe M indow. ntil the R((when 1)</td><td>F setting (L F Mode. Aode. dode. eccive dat @00N014 there is a d @00N014</td><td>a when NG</td>	ode setting (SC 3, and 5 v 3, and 4 v played on the ting will not be pply. ive data when	00 to S10), I when using when using e digital wi activated u	L9=ON/OFI g ON/OFF g Strobe M indow. ntil the R((when 1)	F setting (L F Mode. Aode. dode. eccive dat @00N014 there is a d @00N014	a when NG
Procedures sure that the main power source is turned ON. ms 1, 2, and 3 when using Continuous Mode. e Manual/External Mode Selector to External e Manual/External Mode Selector to EXT to set External Mode. The value set with exugh it is possible to set the external control setting even the manual/external mode selector is set to allekternal mode. ng Up the Network (Only Initially and When Settings Are Changed) e Unit's IP address and the reply address. To enable the settings that were changed. I'em Setting example Send data I'em Setting example Send data I'en Address 192.168.3.2 @00E01192.168.003.00230CRLF Subnet Mask 255.255.255.0 @00E02255.255.250.00035CRLF Default Gateway 192.168.3.1 @00E004456149CRLF Reply IP Address 192.168.3.1 @00E06045624CCRLF ng the Light Intensity Setting Setting fy the channel and set the light intensity. Setting Setting ig the Lighting Mode fy the channel and set the lighting mode. Setting to 2 Setting the Lighting Mode fy the channel and se	Set items Set items Set items cycle the	 Lighting n 1, 2, 1 1, 2, 1<td>3 , and 5 v 3 , and 5 v 3 , and 4 v played on the ting will not be pply. ive data when</td><td>vhen using vhen using vhen using oK</td><td>L9=ON/OFI g ON/OFF g Strobe M indow. ntil the R (when</td><td>F setting (L F Mode. Mode. Aode. eceive dat @00N014 there is a c @00N034</td><td>a when NG</td>	3 , and 5 v 3 , and 5 v 3 , and 4 v played on the ting will not be pply. ive data when	vhen using vhen using vhen using oK	L9=ON/OFI g ON/OFF g Strobe M indow. ntil the R (when	F setting (L F Mode. Mode. Aode. eceive dat @00N014 there is a c @00N034	a when NG
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et ON/OFF Signal in ON/OFF Mode	the L2 ligh	nting mode		Receive		- @	01N0352CF
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king the Unit Status			(a side)	, .,			
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	ing the U	ini status	GOUCESCKI	-	(normal)	(when there	e is a set value out o
tting the Light Intensity and Lighting Mode							
tore the external control setting to default value, send the following command.		1	Send data	Receiv	e data when	OK Rece	ive data wh
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lize the Network Setting	Setting annel Init	ialization	@00RF2CRI	_			

RESET	

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.







Lighting Delay Time

The lighting delay time for lights connected to 24V LIGHT connectors depends on the power consumption of the Light Unit. The lighting delay time for Spotlights connected to 24 HLV LIGHT depends on the intensity of the Spotlights. Refer to the following graphs and tables. * The data in the graphs show reference values when a Light Unit or Spotlight with a 5-m cable is used. (The values are for reference only.)

Power Consumption vs. Lighting Delay Time Characteristic (24V LIGHT)



Light Intensity vs. Lighting Delay Time Characteristic (HLV LIGHT)



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.

0 Errors

If an internal error occurs in the Control Unit, it is displayed on the digital window. Refer to the following table and clear the error before using the Control Unit again.

Digital Window	Error	Status	Clearing the Error	Recovery Method
o[P	Overcurrent Error The current consumption of the Light Unit exceeded 107% of the rating.	Output is stopped.	Check the rating of the LED Light Unit. Connect an LED Light Unit that is within the rating.	Press and hold the setting switch or cycle the power.
EFn	Fan Stop Error The fan has stopped.	Output is stopped.	Doing so may cause product failure. Consult a CCS representative.	Press and hold the setting switch or cycle the power.
OR IZS (Example display) Period	HLV ID Error A Spotlight outside the ID range was connected to an HLV LIGHT connector. If the channel that is connected to a Spotlight that is outside the D range selectd, a nerv will be displayed. If I no Light Unit has ever been connected to the same channel in the 24V LIGHT connectors, Eld will be displayed. If a Light Unit is connected to the same channel in the 24V LIGHT connectors, Channel and the connected to 24V LIGHT connectors can be set normally.	Normal	Check the Spotlight. Connect a Spotlight that is supported by the Control Unit.	Operation recovers automatically.

Error Output

When detecting the error during external control, command will be received as acknowledgement for checking status (over current confirmation) command "C". (This applies only to overcurrent errors and fan stop errors.)

- * Immediately after the error, occurrence of an error will be noticed only one time by using UDP protocol. Notify data is the same as checking status (over current confirmation) command "C".
- For details, refer to 8. Control with External Signals.

11 Optional Accessories (Sold Separately)

External Trigger Input Cable

Model: EXCB2-M10-3



nnector: XG4M-1030-T (manufactured by OMRON)

12 Troubleshooting

If you have any problems during product usage, please look up the cause in this chart. If the situation does not improve, or an unexpected situation occurs, please contact CCS Inc.

	Symptom	Items to check for fixing the problem	Reference page	Symptom	Items to check for fixing the problem	Reference page
	Lights not	Are all power sources turned ON?	3	External control is	Is the external control cable (LAN cable) inserted firmly	3
indifinition of the second sec		Is the LED light cable inserted firmly into the output connector?	3	not possible.		
		Is the AC cord inserted firmly into the AC inlet and a wall socket?	3		Was the command sent correctly? Set the network settings and data correctly.	6, 7
		Does the digital window show an error?	9	Unable to turn the Light Unit ON and OFF or use strobe	Is the external trigger input cable inserted firmly into the external trigger input connector and an external device?	3
		Is an appropriate Light Unit connected to the output connector? Check the Light Unit.	4	- control.	Are the external trigger input cable and external devices wired correctly? Check the connector configuration and correct the wiring.	8
		Is the output connector the correct one for the connected Light Unit? Connect 24V DC Light Units to the 24V LIGHT connectors and Spotlights to HLV LIGHT connectors.	4	-	Is the lighting mode set correctly? Set the value to F00 for ON/OFF Mode. Set the value to F01 to F10 for Strobe Mode.	5, 6
		Is the lighting mode set correctly? Set the lighting mode to F00 for Continuous Mode or ON/OFF Mode	5, 6	-	Is the signal setting correct? Check the setting method and sequence diagram.	8
		Does the logic of the trigger signal match the trigger signal setting switch?	8	Malfunctioning.	Please use designated power sources with stable voltage. Sharing power sources with inverters, motors, etc., may cause malfunction.	-
		Is the external trigger input OFF (in ON/OFF Mode or Strobe Mode)? Check the setting method and sequence diagram.	8	-	Do not bundle product cables with high-voltage lines or power lines. Doing so may cause the product to malfunction. Keep the product cables as far away from such lines as possible	-
	Light intensity control is not possible.	Is the manual/external switch set correctly? Set it to MANU to operate manually and to EXT for external control.	5, 6	Fuming, extreme temperature, smell,	There is a possibility of product failure. Please stop usage immediately and turn OFF the power switch.	_
		Is an appropriate Light Unit connected to the output connector? Check the Light Unit.	4	abnormality.	is dangerous, but contact CCS Inc.	
		Is the output connector the correct one for the connected Light Unit? Connect 24V DC Light Units to the 24V LIGHT connectors and Spotlights to HLV LIGHT connectors.	4	-		
		Have the wrong channels been selected? Check the channels whose lights are to be controlled.	5, 6			
		Is the setting switch locked? Press and hold the setting switch for more than two seconds to release the lock.	5			

13 Main Specifications

Product name	Digital Control Unit for LED Light Units (with Ethernet communications)
Model	PD3-5024-4-EI
Rated capacity	46 W max. for 8 connectors total
Input power supply	100 to 240 VAC (+10%, -15%), 70 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	24V DC
Insulation withstand voltage	1,500 VAC for one minute, Cutoff current: 10 mA,
(input-output, input-FG)	500V DC, 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 ² , Frequency: 10 to 55 Hz, Cycles: 3 minutes,
	Sweep cycle: For 1 hour each in X, Y, and Z directions
Cooling method	Forced air cooling
CE Marking	Safety standard: Conforms to EN 61010-1, EMC standard: Conforms to EN 61326, Class A.
PSE	Specified Electrical Appliance and Material(DC power supply units)Conformity with METI Ordinance Article 1
Environmental regulations	RoHS compliant
Input connector	AC input: 3-pin inlet EN 60320-1 certified C14 type × 1
External control connector	Trigger input: MIL connector (MIL-C-83503 compliant), 10-pole
	For setting the light intensity and lighting mode: RJ-45
Material and surface processing	Material: Aluminum and resin, Surface processing: Blue alumite
Weight	1200 g max.
Accessories	2-m long 3-pip power cord with ground terminal v1. Base Brackets v1 set. Instruction Guide v1

Specifications for Different Output Connectors

Input type	24V LIGHT	HLV LIGHT
Applicable	24V DC light units	Spotlights: HLV2 series, HLV series*
illuminators		*not including HLV-27 series/HLV-14-R/
		HLV-14-GR/HLV-14-BL/HLV-14-SW
Rated capacity	46W max.	Per connector: 3.9 W (700mA) max.
Lighting method	PWM control (125kHz) or	Variable current control
	lighting time control	
Light Unit	Detected when connected	Detected at any time.
connection detection	for the first time.	
Power startup time	0.5 s	3 s
Output	SMP-03V-BC	SMP-03V-BC
connectors	(J.S.T. Mfg. Co., Ltd.) x 4	(J.S.T. Mfg. Co., Ltd.) x 4

Ø. **Environmental Regulation**

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) mecury, (3) cadmium, (4) hexavalent chromium, (5) polybrominated biphenyl (PBB), and (6) polybrominated diphenyl ether (PBDE).

*Standards for "RoHS Directive-Compliant Products"

				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 BaHS Directive are evaluated from these standards)						

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



 O
 : 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.

 Image: Signal Signal

The number used in this logo i	s based on "Management Methods for Controlling Pollution by Electronic Information
Products" and related regulation	is 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, comply	ng with safety and usage caution.

产品中有毒有害物质或元素的名称及含量



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数。 通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,回收再利用或进行度弃处理。

14 Dimensions





Bottom View



