

LED controller with Ethernet interface

OPPD-30E

Instruction Manual

FASTUS

Good Thinking. Good Future

- Thank you for purchasing this "OPPD-30E Series" LED controller.
- Before using this product, please read this manual carefully to ensure proper use.
- Please keep this instruction manual at hand for proper use.
- This product is a dedicated LED controller for industrial LED lighting as a machine vision light source.
- The warranty period of this product is two years, starting from the delivery date.

Optex FA will repair or replace the product free of charge if it should fail to function within the specified warranty period. However, any fault attributable to natural disasters or any other similar disasters or undue alteration or repair will be excluded from the scope of the warranty.

1. Safety Precautions

Safety precautions for ensuring safe operation of this product are displayed as follows with the following symbols. Precautions listed here describe important information about safety. Make sure to follow them accordingly.

Safety Symbols

The safety symbols and their meanings are as follows.

Warning

Indicates that any improper operation or handling may result in moderate or minor injury, and in rare cases, serious injury or death. Also indicates a risk of serious property damage.

Caution

Indicates that any improper operation or handling may result in minor injury or property damage.

Warning

Do not disassemble, repair, modify, deform under pressure, or attempt to incinerate this product. Doing so may cause injury or fire.

Do not use this product in water or in a location where it may be exposed to water. Do not use this product if wet. Doing so may cause a fire or damage the product.

This product is not explosion-proof and should not be used around flammable or explosive gases or liquids. Doing so may cause ignition resulting in a fire.

Do not use air dusters or any spray that uses flammable gas around the product or on the inside of the product. Doing so may cause ignition resulting in a fire.

Do not install this product in any of the following locations. Doing so may cause a fire, damage, or a malfunction.
1. Locations where dust, salt, iron powders, or vapor (steam) is present.
2. Locations subjected to corrosive gases or flammable gases.
3. Locations where water, oil, or chemical splashes may occur.
4. Locations where heavy vibrations or impacts may occur.
5. Locations where the ambient temperature exceeds the rated range.
6. Locations subject to rapid temperature changes (or where condensation occurs).
7. Locations with strong electric or magnetic fields.
8. Outdoor locations or locations subject to direct sun light.

Do not use this product in a non-industrial environment. Doing so may cause induction or radiation interference.

In the event of a malfunction such as smoke comes out from the product. If you detect any malfunction including emission of smoke, abnormal smells or sounds, or the housing becoming very hot, immediately stop operating the product and turn off the power to the controller. Doing so may cause a fire. Repairing the product is dangerous and should in no way be performed by the customer. Contact the Optex FA sales office.

In case water enters the product. If water or any other liquid enters the product, immediately stop operating the product and turn off the power to the controller. Using the product in this condition may cause a fire.

Caution

Do not touch the product with wet hands. Doing so may damage the product.

Do not drop the product or subject the product to strong impacts. Doing so may damage the product.

During operation, this product becomes very hot. Do not keep touching it. Doing so may cause a low-temperature burn.

Follow the instructions in this manual or the specified instruction manual when wiring the product for the correct wiring method. Incorrect wiring can damage the product or cause a malfunction. Output cannot be connected with other LED controller in series nor in parallel.

Use the dedicated cable for connecting the product to the lighting. Use of anything other than the dedicated cable may cause a malfunction or damage the product.

Do not excessively twist or apply stress to the cable. Doing so may damage the cable or the connector.

When connecting the cable, make sure to hold it by the connector portion, and do not apply excessive force to the cable.

When disconnecting the connector, be careful not to touch the terminals inside the connector, and do not allow foreign objects to enter the connector.

Route wiring separately from high-voltage circuits and power circuits. If the wires are routed together, induction may occur, which can cause a malfunction or damage the product. If this is unavoidable, use a conductive object such as a properly grounded conduit as a shield.

Install this product as far away from high-voltage equipment, power equipment, equipment that generates large switching surges, welders, inverter motors, or any equipment that can be a source of noise.

Use the product within the rated ranges.

Install this product and the dedicated controller securely. Failure to ensure secure installation can result in the products falling and becoming damaged.

Make sure to turn the power off before connecting or disconnecting the cable. Connecting or disconnecting while energized may damage the product.

Handling Precautions

- After carefully considering the intended use, required specifications, and usage conditions, install and use the product within the specified ranges.
- All specifications may be changed without notice.
- When using this product, it is the responsibility of the customer to ensure necessary safety designs in hardware, software, and systems in order to prevent any threat to life, physical health, and property due to product malfunction or failure.
- This product is not intended for use with nuclear power, railways, aviation, vehicles, medical equipment, food-handling equipment, or any application where particular safety measures are required. Absolutely do not use this product for any of these fields.
- This product cannot be used in applications that directly or indirectly detect human bodies for the purpose of ensuring safety. Do not use this product as a detection device for protecting the human body.
- Do not use this product for the development of weapons of mass destruction, for military use, or for any other military application. Moreover, if this product is to be exported, comply with all applicable export laws and regulations, including the "Foreign Exchange and Foreign Trade Act" and the "Export Administration Regulations," and carry out the necessary procedures pursuant to the provisions therein.
- For more details on conformity to the Restriction of Hazardous Substances Directive for this product, please contact an Optex FA sales representative. Before using this product, fully examine the applicable environmental laws and regulations, and operate the product in conformity to such laws and regulations. Optex FA does not assume any responsibility for damages or losses occurring as a result of noncompliance with applicable laws and regulations.

2. Specifications

Model	OPPD-30E
Power supply voltage	24 VDC ±10%
Current consumption	Max. 1.3 A
Illumination output	2 ch
Connectable lighting	Max. 30 W (2 ch total)
Illumination output voltage	PWM mode: 12 VDC
Illumination output current	Max. 2.5 A (2 ch total)
Light intensity control	PWM intensity control, Frequency: 50/100/99/98/97 kHz
Monitoring	Lighting brightness monitor/Lighting internal temperature monitor, Monitor brightness alarm upper/lower limit value setting
Feedback	PWM correction method
Input	External illumination control input × 2 ON voltage: 12 V or more, OFF voltage: 2 V or less, Max. input voltage: 30 V Input response time (actual), 24 V input: 5 μs (OFF → ON)/50 μs (ON → OFF), 12 V input: 8 μs (OFF → ON)/45 μs (ON → OFF) Input resistance: 3.9 kΩ, insulated
Communication interface	Ethernet 10BASE-T/100BASE-TX, AutoMDI-X
Communication protocol	UDP/IP, DHCP, iQSS (Mitsubishi Electric's iQ Sensor Solution)
Communication response speed	From command reception to response completion: 6 ms (typ.)
Protective functions	Overcurrent, power supply internal temperature monitoring (PWM output cut to 1/4 at 105°C)
Applicable regulations	EMC (2014/30/EU)/RoHS (2011/65/EU, MIT Order No.32)
Applicable standards	EN 61326-1:2013, EN 55011:2009/A1:2010 Group 1, Class A
Degree of protection	IP30 (IEC 60529: 1989/A1: 1999 + A2: 2013)
Ambient temperature/humidity	0 to 40°C/35 to 85% RH (no condensation)
Storage temperature/humidity	-20 to 70°C/35 to 95% RH (no condensation)
Vibration resistance	10 to 55 Hz; amplitude: 1.5 mm; 2 hours in each of the X, Y, and Z directions
Shock resistance	Approximately 10 G; 3 times in each of the X, Y, and Z directions
Insulation resistance	500 VDC, 10 MΩ or more
Material	Housing: Polycarbonate and aluminum
Weight	150 g
Accessories	Instruction manual, terminal block × 1 (installed)
Options	Panel mounting bracket, Panel stand

Installation notes

Attach the controller to a DIN rail or use the optional panel mounting bracket to securely fix the controller in place.

Notes about the installation position of the controller

Install the controller in a position shown "Good" in the figure below. Avoid any other positions for the installation.

1. Provide at least 50 mm of space all around the device.
When installing multiple copies of this product in a line, ensure that the pitch is 75 mm or more.

2. Do not close the openings on the left, right, top, and bottom sides of the unit.
Take sufficient care to cause convection for release of heat.

3. The ambient temperature range of this product is 0 to 40°C.

4. Take the following into consideration.

- Avoid installing the unit near devices that generate a large amount of heat (heaters, transformers, power supplies, etc.)
- Where the ambient temperature may exceed 40°C, install a forced cooling fan or air conditioner.
- When installing the controller in an enclosure, locate it at the bottom wherever possible.

50 mm or more
75 mm or more
50 mm or more
50 mm or more

3. Connection

With NPN open collector output device

With PNP open collector output device

* When connecting voltage output control equipment, input 12 to 30 VDC between IN and COM. The input photocoupler is bipolar.

Required 24 VDC power supply capacity to handle power consumption of lighting devices

Based on the total power consumption of the LED lighting to be connected, select a 24 VDC power source that offers more than the required capacity.

Required 24 VDC power supply capacity [W]
Total power consumption of lighting devices [W]

Note:
When using in conjunction with other equipment, the characteristics of the other equipment will affect the power supply, so be sure to choose a power supply that has a sufficient margin (about twice as much) as that shown in the table.

4. Part Names and Functions

LAMP1 monitor
Light intensity value/monitored value
Setting name

LAMP1/2 selection display
Displays the selected lamp

LAMP2 monitor
Light intensity value/monitored value Setting

LAMP switch button

MODE switch button

Ethernet Link display
* Green: Connected

Dial + Confirmation button

Panel mounting bracket hole

STATUS display

- * Green: Fb = on
- * Orange: Fb = off
- * Flashing orange: FB error or alarm on monitored brightness
- * Red: Fb = cPb or communication with the lamp terminated
- * Flashing red: LED output over current or power supply temperature error
- * Unlit: Insufficient input voltage of 24 VDC

Ethernet modular jack

LAMP2 output

LAMP1 output

Terminal block

6. List of Setting Items

A long press of the MODE button on the operation panel causes the transition to the "Setting mode."

Indication	Name	Range	Initial value	Unit	LAMP1,2	Description
	Priority of illumination control input	0 ~ 999	0	-	Individual	P5 : While the illumination control input is OFF, the lighting device is illuminated. P5 : While the illumination control input is ON, the lighting device is illuminated.
	Light emitting width	0 ~ 999	0	10 μs/1 ms	Individual	Sets the light emitting width. You can change the unit with setting S5u. Set this to 0 to follow the illumination control input.
	Light emitting width unit	0 ~ 999	0	-	Individual	The value S5u sets the light emitting width unit to 10 μs and the value I sets the unit to 1 ms. The light emitting widths that can be set are 10 μs to 9.99 ms and 1 ms to 999 ms, respectively.
	LED output delay timer	0 ~ 999	0	10 μs/1 ms	Individual	Sets the delay time for the external illumination control. The device may be switched by the setting dL.
	Unit of LED output delay timer	0 ~ 999	0	-	Individual	The value S5u sets the unit of the LED output delay timer at 10 μs and the value I at 1 ms. The delay time ranges that can be set are 0 to 9.99 ms and 0 to 999 ms, respectively.
	Filter time factor for illumination control input selection	0 ~ 999	0	μs	Common	Designates the time for filtering to remove noises of the illumination control inputs. The input delay times are shown below. S5u: 0.8 to 1.0 μs, S5u: 4 to 5 μs, S5u: 20 to 25 μs, S5u: 80 to 100 μs
	Illumination control input selection	0 ~ 999	0	-	Individual	Selects the illumination control input to use. S9: 0: Illumination control input L1 IN, S9: 1: Illumination control input L2 IN
	Monitored brightness lower limit value for alarm	0 ~ 200	0	%	Individual	If the brightness of the lighting being monitored falls lower than the lower limit or becomes higher than the upper limit, which are percentages of the brightness at the time of factory shipment, the STATUS lamp on the corresponding LAMP side flashes in orange.
	Monitored brightness upper limit value for alarm	0 ~ 255	0	%	Individual	If the extension cable for the lighting is long, a reduced brightness will be displayed due to the component of direct current impedance, so keep this in mind when setting the upper and lower limits. Also, the initial values of the alarm upper and lower limits are 0 When Fb is set to on, the feedback error output turns ON if the target brightness is not reached even if the pulse width is adjusted. If Fb is set to on and the monitored brightness alarm has been set, the alarm judgment will be given priority.
	Feedback function	off, on, cPb	off	-	Individual	This function corrects the pulse width so the brightness of the illumination being monitored matches the light intensity value. off: Only monitoring is performed. Feedback is not performed. on: The pulse width is corrected according to the feedback. cPb: Turns OFF the supply of the 6 V communication voltage to the illumination. Select this setting for models on which the supplying of 6 V causes the illumination to light. When the target brightness is not reached even if the pulse width is corrected, the feedback error occurs. However, if the monitored brightness alarm has been set, it will be given priority. When the light intensity value is less than 50 or when the lighting control sequence is being used, the feedback function automatically turns OFF. * If illumination that does not support sensing is connected, light may be emitted for one pulse even when the light intensity value is 0. Illumination whose LEDs light due to the 6 V output for communication are automatically recognized immediately after lighting, and then the signal's 6 V output is shut down. In this situation, "b-" is displayed for the monitoring mode. The automatic shut down is reset when the power is turned OFF. For devices on which the automatic shut down described above does not activate and faint lighting occurs due to the 6 V for communication, set Fb to cPb.
	PWM frequency switching	50, 100, 99, 98, 97	100	kHz	Common	Set the PWM frequency. If the extension cable to the illumination is long, the capacity of the illumination is large, and the light intensity value is also large, the communication between the power supply and the illumination may be broken. In that case, decrease the PWM frequency to 50. Also, when using the same PWM frequency to light illumination that has multiple inputs, flickering may occur due to the interference between PWM outputs.
	Lighting control sequence	off, 2, 3, 4	off	-	Common	You can perform sequence control in which the illumination control input selection, light intensity value, and light emitting width set in advance are used to repeatedly switch between the illumination control inputs in order. This setting sets the count of lighting control sequences. off: Off, 2: 2 times, 3: 3 times, 4: 4 times * When the lighting control sequence is being used, the feedback function automatically turns OFF.
	Sequence reset assignment	off, on	off	-	Common	Use illumination control input L2 to reset and assign the sequence. The assignment of the LAMP2 illumination control input is fixed to illumination control input L1.
	Illumination control input selection	0 ~ 999	0	-	Individual	Selects the control input for the second lighting control sequence. S9: 0: Illumination control input L1 IN, S9: 1: Illumination control input L2 IN
	Light intensity value 2	0 ~ 999	0	-	Individual	Sets the light intensity value for the second lighting control sequence.
	Light emitting width 2	0 ~ 999	0	10 μs/1 ms	Individual	Sets the light emitting width for the second lighting control sequence.
	Illumination control input selection	0 ~ 999	0	-	Individual	Selects the control input for the fourth lighting control sequence. S9: 0: Illumination control input L1 IN, S9: 1: Illumination control input L2 IN
	Light intensity value 4	0 ~ 999	0	-	Individual	Sets the light intensity value for the fourth lighting control sequence.
	Light emitting width 4	0 ~ 999	0	10 μs/1 ms	Individual	Sets the light emitting width for the fourth lighting control sequence.
	DHCP setting (automatic IP address assignment)	on, off	on	-	Common	Turns DHCP ON or OFF. on: The IP address is assigned automatically. off: A fixed IP address is used.
	IP address	0 ~ 255	168.255.0.30	-	Common	Displays and sets the IP address. Each time the dial is pressed briefly, the display transitions between the IP addresses: P1 → P2 → P3 → P4. If DHCP has been used to assign the address automatically, it is displayed.
	Subnet mask	0 ~ 255	255.255.0.0	-	Common	Displays and sets the subnet mask. Each time the dial is pressed briefly, the display transitions between the subnet masks: Sn1 → Sn2 → Sn3 → Sn4. If DHCP has been used to assign the address automatically, it is displayed.
	Gateway	0 ~ 255	0.0.0.0	-	Common	Displays and sets the default gateway. Each time the dial is pressed briefly, the display transitions between the default gateways: Gt1 → Gt2 → Gt3 → Gt4. If DHCP has been used to assign the address automatically, it is displayed.
	Copying of the settings	no, yes	no	-	Common	Copies the settings of LAMP1 to LAMP2. Select "YES" to copy the settings.
	Initialization of the settings	no, yes	no	-	Common	Initializes all the settings of LAMP1 and LAMP2 to the factory shipped state. Select "YES" to initialize the settings.
	Absolute brightness monitoring and brightness adjustment of the lighting intensity	0 ~ 999	-	-	Individual	While ordinary brightness monitoring displays the brightness of the lighting relative to the brightness in the factory shipped state, this displays the absolute brightness (the brightness that reflects individual differences relating to the reference value that depends on the model). Upper monitor: Absolute brightness, Lower monitor: Light intensity value. By adjusting the light intensity value here, you can match the brightness to the target absolute brightness. You can forcibly switch the output regardless of the illumination control input.
	Forced output switch	on, off	-	-	Common	---: Synchronizes the lighting of the illumination with the illumination control input. on: Ignores the illumination control input and turns ON the illumination at all times. off: Ignores the illumination control input and turns OFF the illumination at all times.
	iQSS periodic transmission	off, on	off	-	Common	Turns iQSS periodic transmission ON or OFF. off: Periodic transmission will not be performed. on: The monitored value will be transmitted at the interval specified with iQb.
	Periodic transmission time	1 ~ 999	50	100 ms	Common	Sets the iQSS periodic transmission interval.
	iQSS device number	0 ~ 999	100	-	Common	Sets the leading device number of the iQSS periodic transmission data. Six consecutive digits from this number are used. The device is fixed to D.
	Display version	-	-	-	Common	Displays the software version of the user interface.
	Controller version	-	-	-	Common	Displays the software version of the controller.
	Illumination version	-	-	-	Individual	Displays the software version of the connected illumination.
	Menu termination	-	-	-	Common	Terminates the settings display and returns to the light intensity value display.

- Setting items related to lighting control sequences are only displayed when SE9 is set to a value other than off.
- The versions and the setting items related to iQSS are only displayed when the dial has been turned with the LAMP button pressed. For details regarding iQSS, see the separate user's manual.

7. Error Display

Item	Indication	Error details
Input voltage drop		Displayed if the 24 V power supply voltage has dropped to 18 V or lower.
Internal failure		Communication error of the internal circuit. This is displayed when, due to some failure, the communication with the power supply board fails.
Temperature error		This flashes when the internal temperature of the power supply exceeds 105°C. When a temperature error occurs, this indication flashes until the temperature falls below 95°C. To protect the device, the light intensity value output is reduced to 1/4 while this error is occurring.
Overcurrent		This flashes when an illumination overcurrent is detected. It flashes only for the lamp on which the overcurrent has been detected. When an overcurrent is detected, only the illumination for the overcurrent was detected is turned OFF. You cannot clear this error until you restart the device.
Output voltage error		This flashes when an output voltage error is detected in the internal power supply circuit. Only the lamp indicator for which the output error was detected flashes. When an output error is detected, only the illumination for which the output error was detected is turned OFF. You cannot clear this error until you restart the device.

8. Ethernet Communication

For details, see the separate user's manual.

Support for the China RoHS directive

For details on the support for the China RoHS directive (the Administrative Measure on the Control of Pollution Caused by Electronic Information Products), see the following website.
http://www.optex-fa.com/rohs_cn/

5. Operations for Each Mode

Light intensity control mode

Light intensity values are shown on the LAMP1 and LAMP2 monitors and the LAMP indicator of the selected lamp lights.

Press

Selects either LAMP1 or LAMP2 for setting the light intensity value with the dial.

Press long

Turns OFF the lighting device output for both LAMP1 and LAMP2. Another long press turns the output ON.

Press

Switches to the monitoring mode.

Press long

Switches to the setting reference mode.

Rotate

Changes the light intensity value of the currently selected lamp.

Press

Moves the digit of the light intensity value to be changed.
Pressing the two buttons at the same time brings about a locked state. Performing the same operation again unlocks the state. In the locked state, the light intensity values and settings cannot be changed.

Press long

Transitions to the setting change mode.

Monitoring mode

The monitored values are shown on the LAMP1 and LAMP2 monitors. The LAMP1 and LAMP2 indicators both turn off. If no lighting device is connected, "--" will be displayed. For lighting devices that do not support sensing, "b-" is displayed when communication is shut down automatically. The automatic communication shut down is reset when the power is turned OFF.

Press

While the button is pressed, the LAMP1 and LAMP2 light intensity values or correction light intensity values are displayed.

Press

Returns to the light intensity control mode.

Press

Displays the internal temperature (°C) of the lamp. If no lamp is connected, "--" will be displayed.

Press simultaneously

Displays the internal temperature (°C) of the power supply device. If the temperature reaches 105°C or more, the light intensity value is set to a 1/4 level to protect the internal circuits.

Setting reference mode
(The upper menu display flashes.)

In light intensity control mode, a long press of the MODE button switches the LED lighting controller to the setting reference mode.

Press

Selects the setting to be displayed from LAMP1 and LAMP2.

Press long

Returns to the light intensity control mode.

Rotate

Switches the setting item to be displayed.

Press

Transitions to the setting change mode.

Setting change mode
(The lower setting display flashes.)

In the setting reference mode, pressing the dial switches the LED lighting controller to the setting change mode.

Press long

Returns to the setting reference mode without writing the changed setting.

Rotate

Changes the currently displayed setting.

Press

Moves the digit of a setting to be changed. If left for 30 seconds, the digit for the change returns to the lowest digit.

Press long

Writes the changed setting and returns to the setting reference mode.

* Note: When the light intensity value display is flashing (when the digit is being moved), the displayed light intensity value will be saved if no operations are performed for 1.5 seconds.

Applicable connector specifications

Power supply/input signal terminal block
Applicable connector : PHOENIX CONTACT screw-connection plug 5-pole type, MC 1, 5/5-ST-3, 5
Applicable wire : Single wire: 0.2 to 1.5 mm², twisted wire: 0.2 to 1.5 mm², pin terminal: 0.25 to 1.5 mm², 24 AWG to 16 AWG
Length of stripping part : 7 mm

Illumination output (LAMP1, LAMP2)
Applicable connector housing : JST's SMR-02V-B

Ethernet connector
Applicable cable : STP (Shielded Twisted Pair), category 5e, straight or crossover
Cable length: Max. 100 m

9. Dimensions

48

72

16.2

4

15.4

38

16

26

11.1

44.8

67.6

47.7

31.5

17.7

9.3

36.6

6.2

13.2

45

0

+0.4

4.7P1 or less

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OPTEX FA Homepage

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