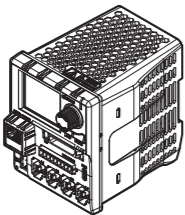


Multifunction LED Lighting Controller

OPPX Series

User's manual can be download from OPTEX FA website.
<https://www.optex-fa.com>



OPTEX FA CO., LTD.

- Thank you for the purchase of the Multifunction LED Lighting Controller "OPPX series."
- Before using this product, read this manual carefully to ensure proper use.
- Read this manual thoroughly, and then keep this manual at hand so that it can be used whenever necessary.
- This product is a dedicated LED controller for industrial LED lighting as a machine vision light source.

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

	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 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 an explosion or 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 an explosion or 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 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 sunlight.
	Do not use this product in a non-industrial setting. 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 to connect to this product, and use an input power supply cable with a sufficiently large wire diameter. 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.
	Always hold the connector when connecting or disconnecting cables. Do not apply excessive force to cables.
	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.

CAUTION	
	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.

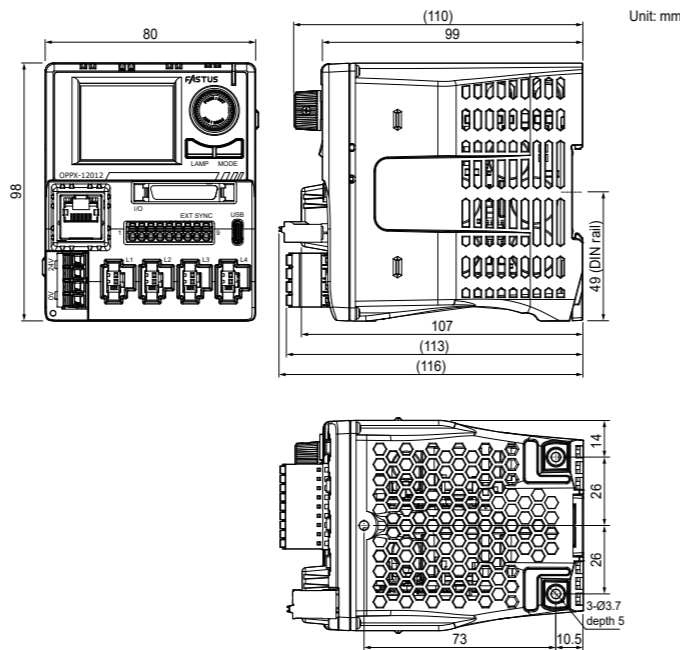
NOTICE

- 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.
- 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.

1. Included Accessories

- This instruction manual
- External illumination control connector
- Power connector

2. Dimensions



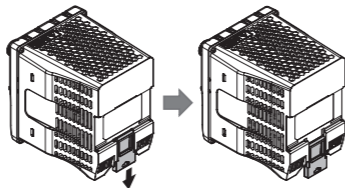
3. Installation

Installation method

Fit the controller to the DIN rail or use the screw holes on the bottom surface to securely fix it.

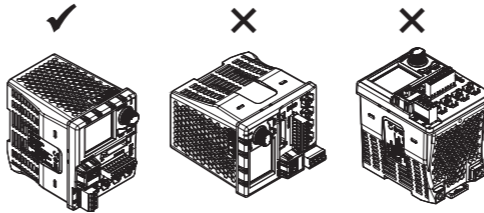
When installing on DIN rail

When attaching or removing the unit, pull the hook at the bottom in the direction of the ➡.



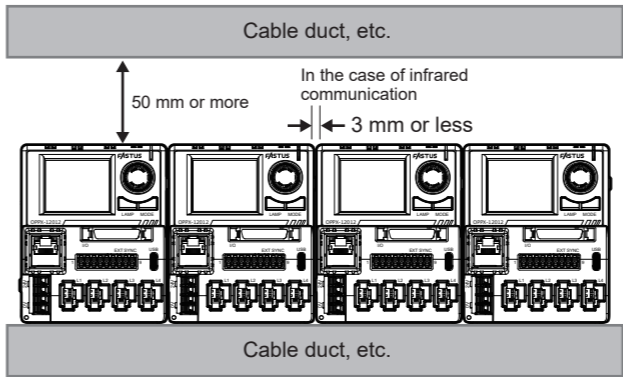
Installation position

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



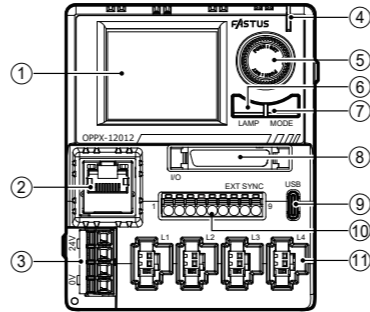
Installation distance limit

- Leave at least 50 mm clearance at the top of controllers.
- If you are using infrared communication to control connection, make sure that the clearance between the controllers is within 3 mm.



- The ambient temperature range of the OPPX series is 0 to 40°C.
- Take the following into consideration. Avoid installing the unit directly over devices that generate a large amount of heat (heater, transformer, power supply unit 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.

4. Part Names



No.	Name	Description
①	View display	Displays the light intensity value, illumination monitor display, and the settings menu.
②	Ethernet connector	Connect when controlling a controller externally over an Ethernet network. Compatible cables: STP (Shielded Twisted Pair), Category 5, 5e or higher. (Models that do not support Ethernet are not equipped with this connector.)
③	Power connector	Connect 24 V and GND.
④	Status LED	Indicates the product status. Green (lit): Running Green (blinking): Warning active Red (blinking): Error active Red (lit): Defective startup
⑤	Dial key	Use to switch between screens and edit/confirm setting values.
⑥	LAMP key	Use to switch the lamp you want to configure.
⑦	Mode key	Use to switch between modes (monitoring / light intensity adjustment / setting) and cancel operations
⑧	External parallel connector	Connect externally via parallel communication or RS232 serial communication. You can also input external illumination control and output the controller status with this connector.
⑨	USB (USB Type-C)	Connect the USB cable to control the controller externally via serial communication. You can also update the firmware. The communication format is USB 1.1.
⑩	External illumination control connector	Use this connector to control illumination externally or output the controller status.
⑪	Illumination output connector	Connect to LED lighting. <ul style="list-style-type: none">• OPPX-6012 and OPPX-10024 have only L1 and L2.• In OPPX-1601224, L1 and L2 are 12 V output type and L3 and L4 are 24 V output type.

5. Connecting Cables

24 VDC input

Select a cable, power supply, and wire according to the specifications.

Specifications

Supply current: 12 A

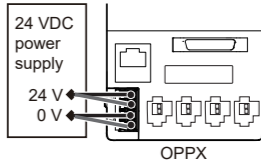
Applicable wire: 0.5 to 2 mm² AWG 20 to 14

Length of stripping part: 11 to 12 mm

Pin number	Signal
1	24 V
2	24 V
3	0 V
4	0 V

Wiring

If the current consumption in the controller exceeds the connector rating of 12 A, wire up the free + and - terminals as shown in the figure below. Also make sure that the wire diameter is large enough.



Note:

When wiring one power supply to one unit and passing power from one unit to another, use the empty terminals. However, do not exceed the connector rating. (Max: 12 A) Also, take into account the total current value of all units when selecting the power supply to use.

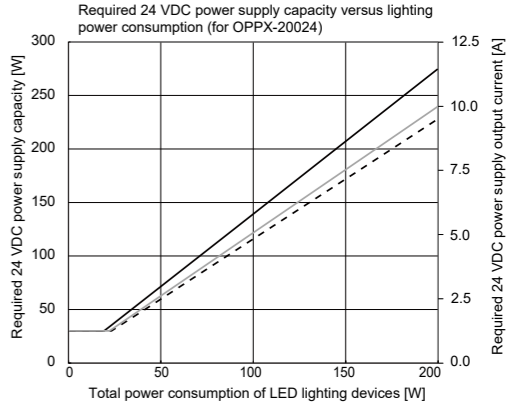
24 VDC power consumption

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

Refer to the graph below.

Note:

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



Illumination output connector

Connector housing	12 V output type		24 V output type	
	FALUX sensing + lighting	Other 12 V input lighting	FALUX sensing + lighting	24 V input lighting
Dedicated extension cable model	Dedicated 3-pin plug connector	JST's SMR-02V-B/N	JST's SMR-03V-B	
Dedicated extension cable model	OP-XCB1-□	OP-CB1-□	OP-FXCB1-□	OP-FCB1-□

External illumination control connector

Applicable wire: 0.2 to 1.3 mm², AWG 24 to 16

Length of stripping part: 9 to 10 mm

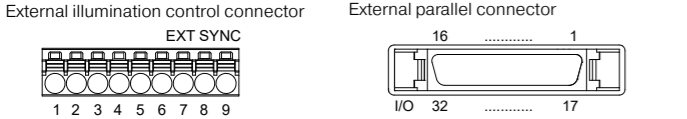
Dedicated cable model: OP-ECBX9-3

Terminal specifications: Push-in

External parallel connector

Applicable connector: HIROSE FX2-32PA insulation-displacement connector with lock
Dedicated cable model: OP-ECBX32-3

6. List of External Parallel Control Connector Signals



Pin number	Name	Detail	Pin number	Name	Detail
1	SYNC1	Synchronous input 1	1	D0	Brightness control bit 0
2	SYNC2	Synchronous input 2	⋮	⋮	⋮
3	SYNC3	Synchronous input 3	10	D9	Brightness control bit 9
4	SYNC4	Synchronous input 4	11	L0	LAMP switching 0
5	SEQRST	Sequence reset input	⋮	⋮	⋮
6	COMIN	Input COM	14	L3	LAMP switching 3
7	USER1	General-purpose output 1	15	BRTWR	Brightness control value writing
8	USER2	General-purpose output 2	16	COMIN	Input COM
9	COMOUT	Output COM	17	RxD	RS232 Receive data
			18	TxD	RS232 Transmit data
			19	SG	RS232 Signal ground
			20	PLSWR	Illumination time write
			21	MASK	Write mask
			22	USER1	General-purpose output 1
			⋮	⋮	⋮
			27	USER6	General-purpose output 6
			28	COMOUT	Output COM
			29	SYNC1	Synchronous input 1
			⋮	⋮	⋮
			32	SYNC4	Synchronous input 4

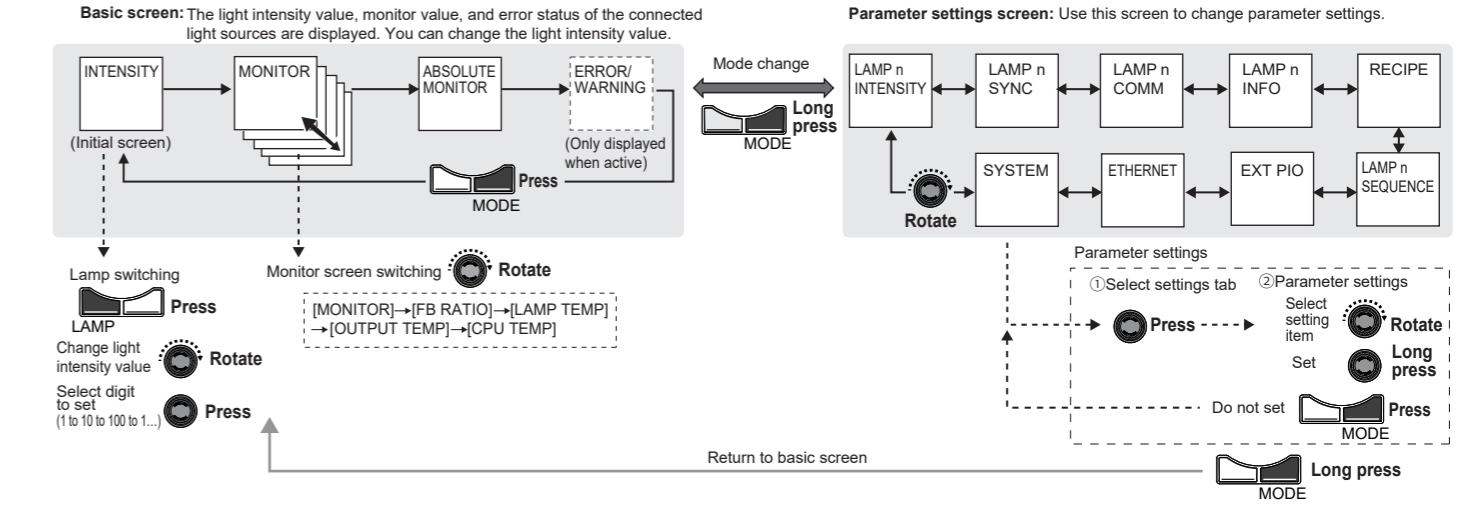
7. Menu List

Tab	Sub menu	Setting value/description	Default value
LAMP n INTENSITY	MODE	PWM, STB, DC, L-INT, L-INT STB	PWM
	INTENSITY	0 to 999	0
	PWM FREQ	12 VDC output type: 50 kHz, 100 kHz, 100 kHz DC, 130 kHz DC 24 VDC output type: 100 kHz DC, 130 kHz DC (Can be set only when the lamp intensity mode is PWM or STB)	100 kHz (12 V output type), 100 kHz DC (24 V output type)
	PWM FREQ ADJ	AUTO, -1, -2, -3, OFF (Can be set only when the lamp intensity mode is PWM or STB)	AUTO
	DC RANGE*1	LOW, HIGH	HIGH
LAMP n SYNC	MODE	EXT, INT, OFF	INT
	DELAY	Numerical value: 0 to 999, Unit: μs/ms	0 μs
	WIDTH	Numerical value: 0 to 999, Unit: μs ^{1/2} /ms	0 ms
	COUNT	Displays the number of lights per lamp. (When the upper limit is reached, it returns to 0.)	*3
	COUNT RESET	OFF, ON	OFF
	ENABLE	-	-
	SYNC1	OFF, ON	*4
	⋮	⋮	⋮
	SYNC4	OFF, ON	
	POLARITY	-	-
	SYNC1	NEG, POS	POS
	⋮	⋮	⋮
	SYNC4	NEG, POS	
	FILTER	1 to 1000 μs	1 μs
	INT STB PERIOD	Numerical value: 0 to 2000, Unit: 0.1 ms/1 ms	250 ms
	Lx-ON OFF DELAY	0 to 999 μs	0 μs
	5V SYNC	OFF, ON	OFF
LAMP n COMM	FEEDBACK	MONITOR, ON, OFF, ABSOLUTE AUTO ADJUST	MONITOR
	FB RATE	Displays the feedback correction rate.	*3
	LAMP COMM	Displays the connection status (FALUX+/FALUX/NONE).	*3
	BRIGHT RATIO	Displays percentage of monitor value versus light intensity value.	*3
	ALARM HIGH	0 to 255 %	0 %
LAMP n INFO	ALARM LOW	0 to 255 %	0 %
	LAMP MODEL	Displays the light source model.	*3
	SERIAL NUM	Displays the light source manufacturing code.	*3
	MONITOR	Displays the received light brightness (monitor value).	*3
	ABSOLUTE MONITOR	Displays the absolute brightness monitor.	*3
	TEMP	Displays the light source temperature.	*3
	TEMP LIMIT	Displays the maximum permitted temperature of the light source.	*3
	DC MON LIMIT	The lower limit of the light intensity value that stops feedback control to the light source. (When the light intensity "MODE" is "DC")	*3
	LINT MON LIMIT	The lower limit of the light intensity value that stops feedback control to the light source. (When the light intensity "MODE" is "L-INT" or "L-INT STB")	*3
	APPLIED VOLTAGE	Displays the light source input voltage.	*3
	SW VERSION	Displays the light source software version.	*3
	POWER	Displays the light source power consumption.	*3
	WAVELENGTH	Displays the light source wavelength.	*3
	LED TOTAL TIME	Displays the light source cumulative illumination time.	*3
	LED USE TIME	0 to 4,294,967,295 s	0 s
RECIPE	NUMBER	1 to 16	1
	MEMO	Recipe note (Arbitrary character string can be set by communication)	*3

Tab	Sub menu	Setting value/description	Default value
LAMP n SEQUENCE	TOTAL NUM OF SEQ	0 to 15	0
	SEQ NUM FIX	0 to 16	0
	SEQ NUM NOW	Displays the current sequence number.	*3
	RESET INPUT	SEQRST, SYNC1, SYNC2, SYNC3, SYNC4	SEQRST
	RESET EXE	OFF, ON	OFF
	INTENSITY 1	0 to 999	0
	WIDTH 1	Numerical value: 0 to 999 , Unit: μs ^{1/2} /ms	0 ms
	⋮	⋮	⋮
	INTENSITY 16	0 to 999	0
	WIDTH 16	Numerical value: 0 to 999 , Unit: μs ^{1/2} /ms	0 ms
	IN MODE	OFF, INTENSITY, RECIPE	INTENSITY
	IN FILTER	5, 25, 50, 100, 300, 500, 1000 μs	5 μs
	IN POL	NEG, POS	POS
	OUT POL	NEG, POS	POS
	USER OUTPUT MODE	-	-
EXT PIO	USER1	OFF, RUN, L1 ON to L4 ON, L1 SYNC to L4 SYNC, L1 SEQ 1 to L4 SEQ 1, Lx ON, ERROR, WARNING, MST ERR, MST WRN	Lx ON
	USER2		L1 ON
	USER3		L2 ON
	USER4		L3 ON
	USER5		L4 ON
	USER6		OFF
ETHERNET	IP ADDRESS	(Can be set when DHCP is turned off)	169.254.0.31
	SUBNET MASK	(Can be set when DHCP is turned off)	255.255.0.0
	GATEWAY	(Can be set when DHCP is turned off)	0.0.0.0
	PORT	61440	*3
	DHCP	OFF, ON	ON
	MAC ADDRESS	Displays the MAC address.	*3
	iQSS COM IP	Communication counterpart IP address	255.255.255.255
	iQSS COM PORT	Communication counterpart port number	65535
	iQSS UPDATE	OFF, ON	OFF
	iQSS TX PERIDO	iQSS periodic transmission	5.0 s
	iQSS DEVICE NUM	iQSS device number	100
	HOST NAME	Host name (can be changed by Ethernet communication)	*3
SYSTEM	MODEL	Displays the main unit model.	*3
	OPERATING TIME	Displays the operating time. (Days: Hours: Minutes: Seconds)	*3
	TOTAL POWER	Displays the power consumed by the power supply.	*3
	MANUAL ENTRY MODE	OFF, ON	OFF
	LCD ACTIVE TIME	0000 to 3600 s	300 s
	RS232 BAUDRATE	OFF, 4800, 9600, 19200, 38400, 57600, 115200 bps	9600 bps
	LANGUAGE	ENGLISH, 日本語	*5
	PASS CODE	0000 to 9999	0000
	COPY FROM	LAMP1 to LAMP16	LAMP1
	COPY TO BEGIN	LAMP1 to LAMP16	LAMP1
	COPY TO END	LAMP1 to LAMP16	LAMP1
	COPY EXE	OFF, ON	OFF
	MODULE POSITION	MAIN, EXPANSION1, EXPANSION2, EXPANSION3	*3
	MY CONFIG	Output voltage/channel No.	*3
	E1 CONFIG	Display examples: OPPX-6012x2: 12 V/2 ch OPPX-20024x4: 24 V/4 ch When the expansion device is not connected: NONE	*3
	E2 CONFIG		*3
	E3 CONFIG		*3
	FW VERSION	Displays the firmware version.	*3
	UNIQUE ID	Displays the unique ID using 17 alphanumeric characters.	*3
	POWER DROP	Displays the number of times the 24 VDC power supply voltage has dropped.	*3
	LAMP1 CAP STATUS	Displays the degradation of each LAMP capacitor from its initial state.	*3
	DECREASE TIME	The deterioration time shows the predicted time to 1 % deterioration.	
	⋮	⋮	⋮
	LAMP4 CAP STATUS		
	DECREASE TIME		
	ERROR RESET	OFF, ON	OFF
	STOP SAVING	OFF, ON	OFF
	INIT	BACK, CURRENT RECIPE, AL RECIPE, COMMON SETTING, LANGUAGE	BACK

*1 Only displayed for the 24 V output type.
*2 Depends on the PWM FREQ setting.
*3 These items are display only.
*4 Only ON for the same SYNC number as the LAMP number. Other SYNC numbers are OFF.
*5 Select this item at the initial startup or startup after a reset.

8. Screen Layout and Basic Operations



9. Specifications

Model		Models without Ethernet		OPPX-6012P2	OPPX-12012P4	OPPX-1601224P4	OPPX-10024P2	OPPX-20024P4		
		Models with Ethernet		OPPX-6012E2	OPPX-12012E4	OPPX-1601224E4	OPPX-10024E2	OPPX-20024E4		
Supply voltage				24 VDC ±10%						
Output channels				2 ch	4 ch	2 ch (L1, L2)	2 ch (L3, L4)	2 ch	4 ch	
Connectable illumination rating				All channels max Max per channel	60 W	120 W	60 W	100 W	100 W	200 W
Illumination output voltage				30 W/ch			50 W/ch			
				12 VDC (Standard)			24 VDC (Standard)			
				18 VDC			48 VDC			
				8 to 12 VDC			LOW: 12 to 24 VDC, HIGH: 18 to 24 VDC			
				12 VDC			24 VDC			
Illumination output current				18 VDC			36 VDC			
				PWM/DC/L-INT mode (Max per channel)			2.5 A/ch			2.0 A/ch
STB/L-INT STB mode (Max per channel)				8.0 A/ch (Duty 10%)			5.0 A/ch (Duty 7%)			
Light intensity control				PWM intensity control, Frequency:50 kHz, 100 kHz, 100 kHz DC, 130 kHz DC Voltage variable mode			PWM intensity control, Frequency:100 kHz DC, 130 kHz DC Voltage variable mode			
Strobe		Light emitting time ^{*1}		PWM frequency setting at 50 kHz : 20 to 19980 μs (20 μs step), 1 to 999ms (1 ms step) PWM frequency setting at 100 kHz, 100 kHz DC : 10 to 9990 μs (10 μs step), 1 to 999 ms (1 ms step) PWM frequency setting at 130 kHz DC : 7.7 to 7684.6μs (7.7 μs step), 1 to 999 ms (1 ms step)						
		Flash cycle limit		10 % Duty (10 times or more the pulse width cycle required)					7 % Duty (14.3 times or more the pulse width cycle required)	
Input		External illumination control pin (SYNC1 to 4, SEQRST)		ON voltage: 12 to 24 VDC, OFF voltage: 1.0 VDC or less, Response time: OFF to ON within 2 μs, ON to OFF within 12 μs						
		External parallel control pin		ON voltage: 5 to 24 VDC, OFF voltage: 1.0 VDC or less, Response time: OFF to ON within 86 μs, ON to OFF within 22 μs						
Output				General-purpose outputs that can be changed: 6 Photocoupler open collector output Max.50 mA/30 VDC Residual voltage 1.5 V (at 10 mA)						
Communication interface		USB(Full-speed, Type-C connector)		Serial communication via virtual COM port						
		RS232		4800/ 9600/ 19200/ 38400/ 57600/ 115200 bps						
		Ethernet (10BASE-T/100BASE-TX) * Only installed in OPPIX-xxxEx		UDP, TCP, DHCP, iQSS (Mitsubishi Electric's iQ Sensor Solution)						
Ambient temperature/humidity				0 to +40°C/20 to 85 % RH (no condensation)						
Storage temperature/humidity				-20 to +70°C/20 to 95 % RH (no condensation)						
Vibration resistance				10 to 55 Hz; Double amplitude: 1.5 mm; 2 hours in each of the X, Y, and Z directions						
Shock resistance				10 G; 3 times in each of the X, Y, and Z directions						
Material				Polycarbonate						
Weight				2 ch type : 260 g, 4 ch type : 360 g						
Degree of protection				IP20 (IEC 60529)						
Applicable regulations		EMC ^{*2}		EU EMC directive (2014/30/EU), UK EMC (The Electromagnetic Compatibility Regulations 2016)						
		Environment		EU RoHS directive (2011/65/EU), China RoHS (MIIT Order No.32) UK RoHS (The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012)						
Applicable standards				EN 61326-1, EN 55011 Group 1, Class A						
Design life				7 years (maximum load, 24 hours continuous use, 40°C environment)						
Accessories				External illumination control connector, Power connector, Instruction manual						

*1: If the strobe emitting time exceeds 1ms, the 12V type will be driven at DC12V, and the 24V type will be driven at DC24V.
*2: If the light intensity value is set to 900 or higher, noise may increase depending on the user's cable wiring conditions.
In that case, attach a ferrite core to the end of the Illumination output cable on this product side.
Recommended ferrite core: NFT-13S (Manufactured by TAKEUCHI INDUSTRY CO., LTD. Maximum cable diameter: 13.5 mm)

- Support for the China RoHS directive
- For details on the support for the China RoHS (the Administrative Measure on the Control of Pollution Caused by Electronic Information Products), see the following website.
https://www.optex-fa.com/rohs_cn/
- Specifications are subject to change without notice.
- For more information, questions and comments regarding product, please contact us at the information below.

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